144/430MHz FM DUAL BANDER

TM-V7A/E

SERVICE MANUAL

KENWOOD

Microphone assy
(T91-0568-05):K, M3

Metallic cabinet (Upper)
(A01-2122-13)

Knob (PM)
(K27-3168-23)

Knob (MNU)
(K27-3169-33)

Knob (VFO)
(K27-3166-23)

Knob (MR)
(K27-3167-23)

Cover (DIN 6P)
(F07-1428-23)

Sub panel
(A22-0798-11)

Knob (MAIN)
(K29-5133-03)

Panel assy
(A62-0492-33)

Knob (VOL)
(K29-5134-03)

Knob (SQL)
(K29-5135-03)

Button knob (MAIN, PUSH)
(K27-3172-03)

Photo is K Type

CONTENTS

TM-V7A/E

CIRCUIT DESCRIPTION

Outline

This device is a dual-band 144/430MHz FM car transceiver planned and designed for amateur radio communications and has the following features.

1. The use of a full dot matrix green LCD display and LED light sources (green LEDs + color conversion filters) has improved the visual verification, operability, and functionability. This also improves the lifespan compared to illumination with conventional light bulbs. Display can be switched between negative and positive.
2. The main unit is 40x140 mm. The detachable operation panel is 51.5x105 mm.
3. Maximum 280 channel memory (180 channels in memory name registration mode)
4. Top surface and front surface heat dispersion structure
5. Built-in CTCSS functions with 38 different selectable tones
6. New personal computer interface function added to 9600-bps data terminal
7. Functions can be controlled with received DTMF signals.
8. Visual scan functions/independently operable 4-channel PM function/key name switch function

List of Destinations

Model		Guarantee frequency range (MHz)		Output power (W)	
		144	430	144	430
TM-V7A	K	144~148	438~450	50	35
	M2		430~440		
	M3				
TM-V7E	E	144~146	430~440	50	35
	E3				

Accessories

Parts name	Parts No.	Q'ty	Destination
Warranty card	———	1	K, E, E3
Instruction manual	———	—	all
DC cord	E30-2111-15	1	all
Fuse (15A)	F51-0017-05	1	all
Microphone	T91-0396-05	1	M2, E, E3
Microphone (DTMF)	T91-0568-05	1	K, M3
Mobile bracket	J29-0632-03	1	all
Screw set	N99-0331-05	1	all

Units for Each Model and Destination

Model		TX-RX UNIT (A/3, B/3, C/3)	LCD ASSY
TM-V7A	K	X57-5230-11 *(X57-5270-11)	B38-0772-XX
	M2	X57-5230-22 *(X57-5270-22)	
	M3		
TM-V7E	E	X57-5232-71 *(X57-5272-71)	
	E3		

*(　) Singapore made

CIRCUIT DESCRIPTION

Frequency Configuration

The TM-V7A/E has separate VHF band and UHF band PLL and intermediate frequency units, so simultaneous 2-band reception is possible. There is also a VHF sub-receiver for receiving VHF band signals with the UHF section and UHF sub-receiver for receiving UHF band signals with the VHF section.

The 144MHz band receiver is mixed down with the first local oscillation 182.85 to 184.845MHz (E), 182.85 to 186.845MHz (K, M) to form the first intermediate frequency of 38.85MHz. It is further mixed down with the second local oscillation 38.4MHz to obtain the second intermediate frequency of 450kHz.

The 430MHz band receiver is mixed down with the first local oscillation 384.95 to 394.945MHz (M, E), 392.95 to 404.945MHz (K) to form the first intermediate frequency of 45.505MHz. It is further mixed down with the second local oscillation 45.505MHz to obtain the second intermediate frequency of 455kHz.

The 144MHz sub-band receiver is mixed down with the first local oscillation 189.05 to 191.045MHz (E), 189.05 to 193.045MHz (K, M) to form the first intermediate frequency of 45.05MHz. This output is input to the UHF receiver No.2 intermediate frequency section to obtain 455kHz.

The 430MHz sub-band receiver is mixed down with the first local oscillation 391.15 to 401.145 MHz (M, E), 399.15 to 411.145MHz (K) to form the first intermediate frequency of 38.85MHz. This output is input to the VHF receiver No.2 intermediate frequency section to obtain the second local frequency of 450kHz.

Thus, the 144MHz band and 430MHz band receivers and sub-receivers all use double conversion.

The 144MHz band and 430MHz band transmitters both have a PLL circuit with direct frequency division and direct oscillation and amplify as is with a straight amp and transmit. The main circuits are used to transmit signals even if a sub-band is being used.
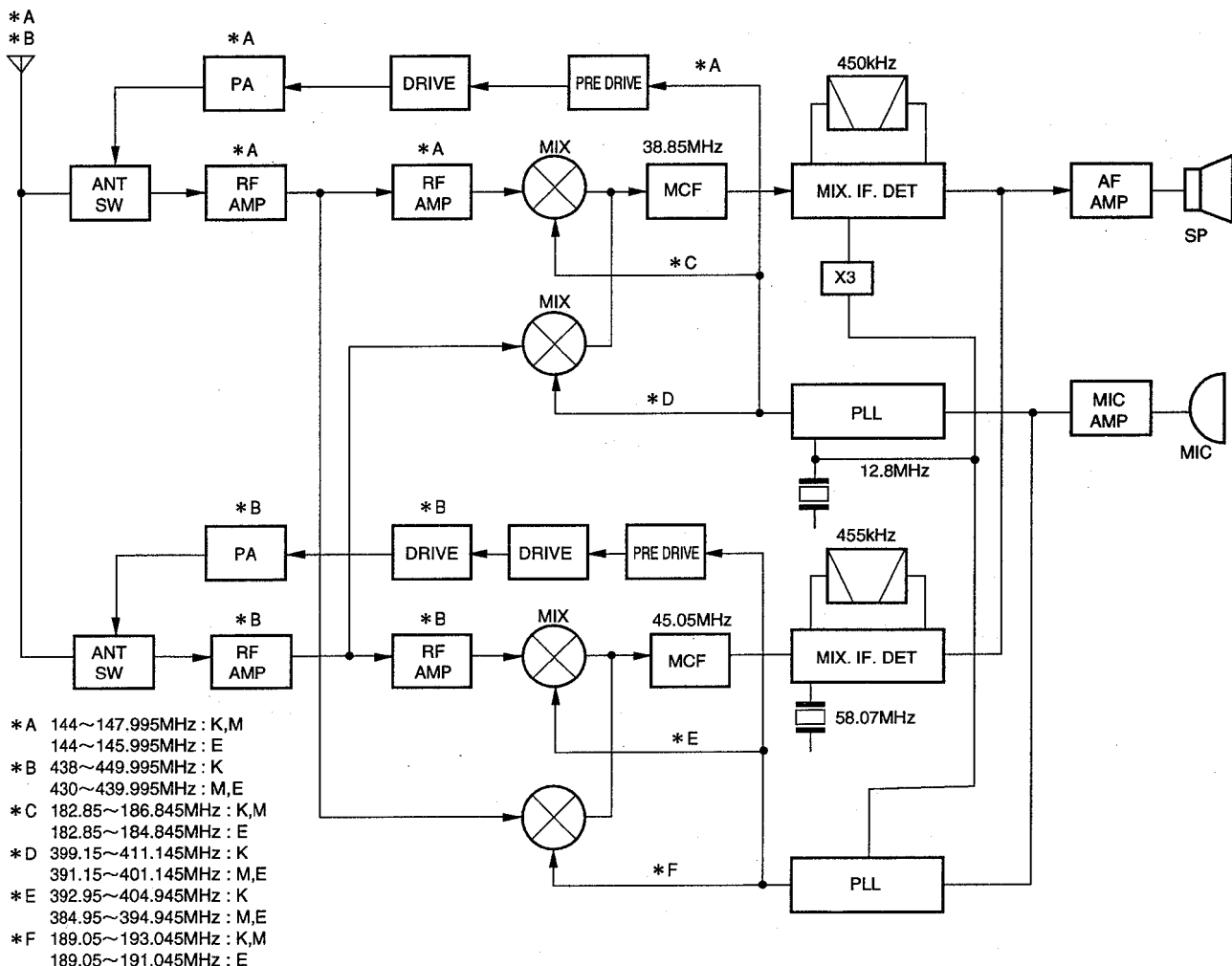

*A 144~147.995MHz : K,M
    144~145.995MHz : E
*B 438~449.995MHz : K
    430~439.995MHz : M,E
*C 182.85~186.845MHz : K,M
    182.85~184.845MHz : E
*D 399.15~411.145MHz : K
    391.15~401.145MHz : M,E
*E 392.95~404.945MHz : K
    384.95~394.945MHz : M,E
*F 189.05~193.045MHz : K,M
    189.05~191.045MHz : E

Fig.1 Frequency configuration

TM-V7A/E

CIRCUIT DESCRIPTION

144MHz Band Transmit Circuit

●Outline
The transmitter directly oscillates the target frequency and directly frequency modulation is applied with a variable-capacity diode.

●Modulation circuit
In the control unit, the audio signals are amplified and limited and passed through a splatter filter, then mixed with subtones from the microprocessor, and directly frequency modulated by a VCO (IC10) with a variable-capacity diode.

●Younger stage circuit
The signals from the PLL unit are input to the drive circuit. Q56 and Q61 carry out stable amplification over a broad band without regulation and can obtain adequate output to drive the final module.

●APC circuit
The automatic transmission output control circuit (APC) uses a differential amplfier circuit (IC16) to compare and amplify the reference voltage that forms the CPU PWM output and the DC voltage that detects part of the transmission power with diodes (VHF: D41 and D42; UHF: D37 and D39) and for that output controls the DB voltage with a preamp (Q67) and control transistor (Q66) and holds the transmission output constant.

430MHz Band Transmit Circuit

●Outline
The transmitter directly oscillates the target frequency and directly frequency modulation is applied with a variable-capacity diode.

●Modulation circuit
In the control unit, the audio signals are amplified and limited and passed through a splatter filter, then mixed with subtones from the microprocessor, and directly frequency modulated by a VCO (IC12) with a variable-capacity diode.

●Younger stage circuit
The signals from the PLL unit are input to the drive circuit. Q53, Q57, and Q60 carry out stable amplification over a broad band without regulation and can obtain adequate output to drive the final module.

Six sets of PWM data, high-, medium-, and low-power each for VHF and UHF are stored into EEPROM memory (IC512) and for each power condition, the data is extracted from the EEPROM to control the power.
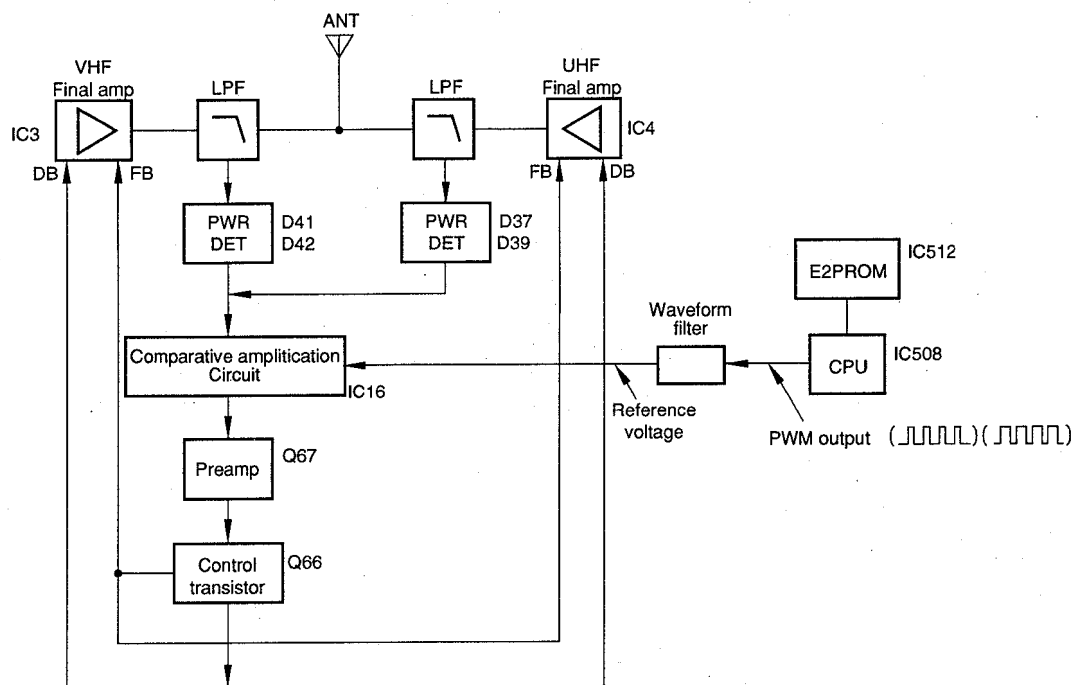

Fig.2 APC circuit

CIRCUIT DESCRIPTION

144MHz Band Reception Circuit

After the 144MHz antenna input signals pass through the final section antenna switching diode, they go through the front section matching coil, are amplified with the GaAs field effect transistor, go through a divider, and are amplified with a single-stage junction field effect transistor. The unwanted signal is eliminated with a band pass filter made up of a 3-stage variable-capacity diode chain and the result goes to the first mixer. In the first mixer, the signals are mixed with the first local signal from the PLL and converted to the first intermediate frequency signal of 38.85MHz, then the unwanted proximate signal is eliminated in the 2-stage MCF.

The first intermediate frequency signal is amplified and input to the FM intermediate frequency (IC13). This intermediate frequency signal is mixed with the second local oscillator frequency of 38.4MHz to make the second intermediate frequency of 450kHz and after the unwanted proximate signal is eliminated with an FM ceramic filter, the signal is input to IC13 again. Here, second intermediate frequency amplification and detection are carried out to form the audio signal.

● S meter circuit

The FM intermediate frequency IC13 S meter output voltage is connected to the control unit and A/D converted by the CPU to drive the LCD bar meter.

430MHz Band Reception Circuit

After the 430MHz antenna input signals pass through the final section antenna switching diode, they go through the front section matching coil, are amplified with the GaAs field effect transistor, go through a divider, go through a SAW filter to eliminate the unwanted signal and the result is input to the first mixer. Here, the signals are mixed with the first local signal from the PLL and converted to the first intermediate frequency signal of 45.05MHz, then the unwanted proximate signal is eliminated in the 2-stage MCF.

The first intermediate frequency signal is one-stage amplified and input to the FM intermediate frequency (IC15). This intermediate frequency signal is mixed with the second local oscillator frequency of 45.505MHz to make the second intermediate frequency of 455kHz and after the unwanted proximate signal is eliminated with an FM ceramic filter, second intermediate frequency amplification and detection are carried out to form the audio signal.

● S meter circuit

The FM intermediate frequency IC15 S meter output voltage is connected to the control unit microprocessor and A/D converted by the CPU to drive the S meter.

Item	Rating
Center Frequency	38.85MHz
Pass band width	±7.5kHz ot more at 3dB
Attenuation band width	±25kHz ot less at 36dB
	±45kHz ot less at 58dB
Guaranteed attenuation	80dB or more within Fo - (±1000kHz)
	(Spurious:40dB or more within ±1MHz)
Ripple	1dB or less
Insertion loss	3dB or less
Termination impedance	550Ω ±10%, 2.5pF ±0.5pF

Table1 MCF(L71-0482-05) (TX-RX Unit XF1)

Item	Rating
Norminal center frequency	450kHz
6dB band width	±6.0kHz or more (from 450kHz)
50dB band width	±15.0kHz or more (from 450kHz)
Ripple	3dB or less (within 450±5kHz)
Insertion loss	6dB or less (at minimum lost point)
Guaranteed attenuation	35dB or more (within 450±100kHz)
I/O matching terminating impedance	

**Tabel2 Ceramic filter(L72-0931-05)
(TX-RX Unit CF1)**

Item	Rating
Center Frequency	45.050MHz
Pass band width	±7.5kHz ot more at 3dB
Attenuation band width	±35kHz ot less at 40dB
Guaranteed attenuation	80dB or more within Fo - (890~930kHz)
	(Spurious:40dB or more within ±1MHz)
Ripple	1dB or less
Insertion loss	4dB or less
Termination impedance	800Ω ±10%, 2pF±0.5pF

Table3 MCF(L71-0481-05) (TX-RX Unit XF2)

Item	Rating
Norminal center frequency	455kHz
6dB band width	±6.0kHz or more (from 455kHz)
50dB band width	±12.5kHz or less (from 455kHz)
Ripple	3dB or less (within 455±5kHz)
Insertion loss	6dB or less (at maximum output point)
Guaranteed attenuation	35dB or more (within 455±100kHz)
I/O matching terminating impedance	2.0kΩ

**Table4 Ceramic filter(L72-0366-05)
(TX-RX Unit CF2)**

TM-V7A/E

CIRCUIT DESCRIPTION

144MHz Sub-Band Reception Circuit

The signals input from the antenna first go into the 144MHz band main reception front end section. After they are amplified with a GaAs field effect transistor (Q11), the divider circuit divides them into two systems, the 144MHz main section and the 144MHz sub-section, and they are connected to the 430MHz band sub-receiver circuit. In the sub-receiver circuit, first the unwanted component is eliminated with a filter circuit, then the signals are mixed with the first local oscillator by a field effect transistor (Q44) to convert them to the first intermediate frequency of 45.05MHz. After these signals are connected to the main 430MHz band circuit, the 144MHz sub-reception is carried out using the main circuit.
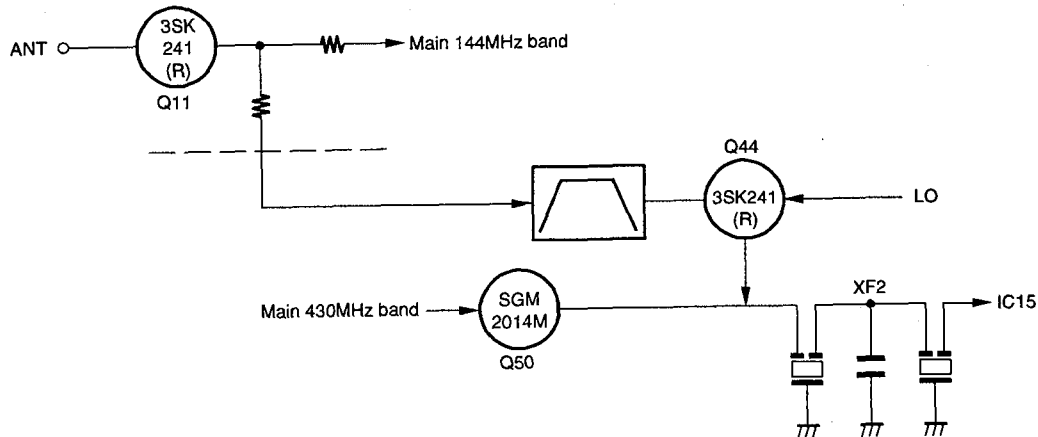

Fig.3 144MHz sub band receive circuit block diagram

430MHz Sub-Band Reception Circuit

430MHz band signals can be received with the 144MHz unit. First, the reception signals entering from the antenna pass through the 430MHz unit final section antenna switching diode, go through the matching coil, and are amplified by Q23, a GaAs field effect transistor. The amplified reception signals go through the divider, have the unwanted signal eliminated by a band pass filter, and go into the first mixer. In the first mixer, the signals are mixed with the first local signal from the PLL, are converted to the first intermediate frequency of 38.85MHz, then are received with the same operations as for the 144MHz band.
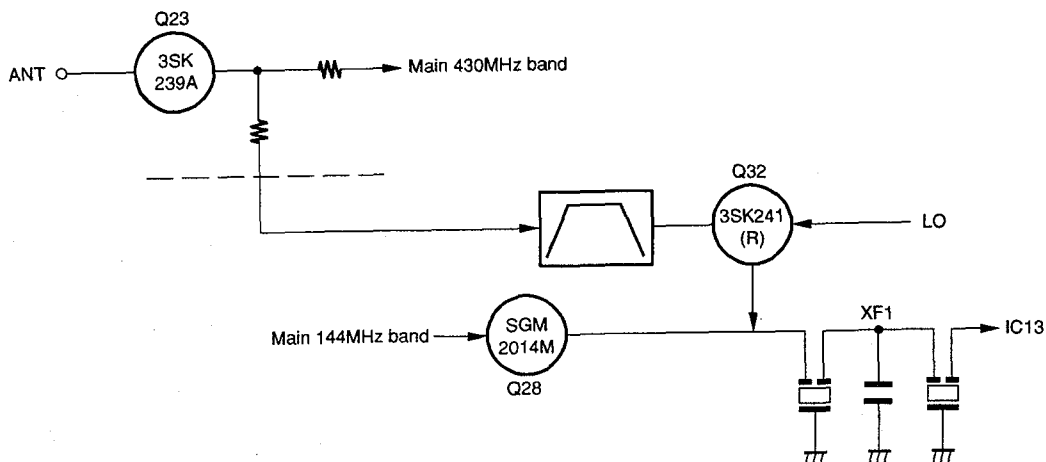

Fig.4 430MHz sub band receive circuit block diagram

CIRCUIT DESCRIPTION

Squelch Circuit

The squelch control angle is read into the panel section microprocessor and converted from analog to 6-bit digital. For adjustment mode, on the main unit side, the threshold level signal is received and the SQ voltages (SQV and SQU) at that time are stored into the microprocessor. The microprocessor calculates the squelch release voltage using this voltage as the reference. This voltage and the panel section squelch control voltage are compared and the squelch switched on and off.

Shift Register Circuits

The TX-RX units have two shift registers (IC19 and IC20: BU2090FS) and carry out the control below.

●IC19 Control

Pin No.	Name	Function
1	Vss	GND
2	DATA	Serial data input
3	CLOCK	Clock
4	VRX	144 8RSW
5	UTX	430 8TSW
6	VTX	144 8TSW
7	AM2	AGC control
8	AM1	AGC control
9	V14RSW	144 band reception power control
10	V43RSW	Sub 430 band reception power control
11	VRX	430 8RSW
12		
13	U43RSW	430 band reception power control
14		
15	U14RSW	Sub 144 band reception power control
16	VDD	5V

●IC20 Control

Pin No.	Name	Function
1	Vss	GND
2	DATA	Serial data input
3	CLOCK	Clock
4		
5	AM SW	AM switching
6		
7		
8	USHIFT	UHF VCO shift
9	FAN	Fan control
10	VPLL	VCO high-speed lock (VHF)
11	VSHIFT	VHF VCO shift
12	AGC	AGC switch
13	VAIP	VHF AIP switch
14	UAIP	UHF AIP switch
15	UPLL	VCO high-speed lock (UHF)
16	VDD	5V

TM-V7A/E

CIRCUIT DESCRIPTION

Unlock Circuit

The signal whose phase has been compared from the PLL ICs (IC6 and IC7: MB1511PFV-GBND) is output, goes through the waveform circuit, and is input to the microprocessor. If the level after waveforming is low, the microprocessor judges this to be the unlock signal and does not transmit and does not send the transmission signals to the shift registers. The microprocessor also generates the beep to announce the unlocking. Unlocking is announced in the same manner for reception too.
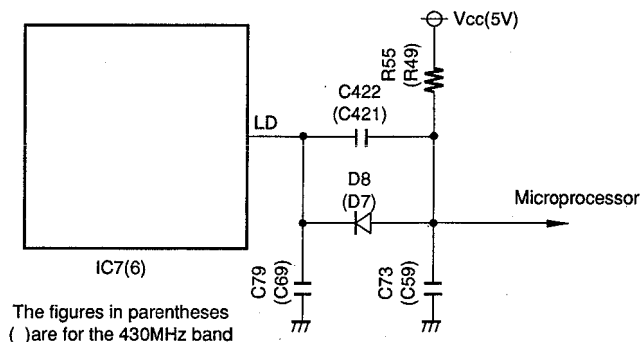

Fig.5 Unlock circuit

AF Signal System

The RAV and RAU detection signals for the 144MHz band and the 430MHz band and the VO signal from the audio composite unit are converted to beep signals by the cross point switch (IC503: JLC1555F), the level is adjusted by the electronic control (IC504: MB87032APFGBND), the result goes into the cross point switch (IC503) again, goes through the speaker switching circuit, and is output to the power amp and headphone jack.

●Beep circuit and mute circuit

When a key is pressed, the beep is output from P32 of the microprocessor (IC508).

For DTSS operation, the signals are output from ANO1 of the microprocessor as the monitor. These signals are switched by the cross point switch (IC503)and are input to the electronic control (IC504). While the beep signal is output from the microprocessor, audio signals for each band are muted by the cross point switch (IC503) with theserial data from the microprocessor (IC508).

The signals output from the electronic control (IC504) go into the cross point switch (IC503) again, go through the audio output mute circuit (Q8 and Q9), and are input to the speaker switching circuit. The data transmission from the microprocessor to the electronic control (IC504) is the same as for the TM-733A/E.
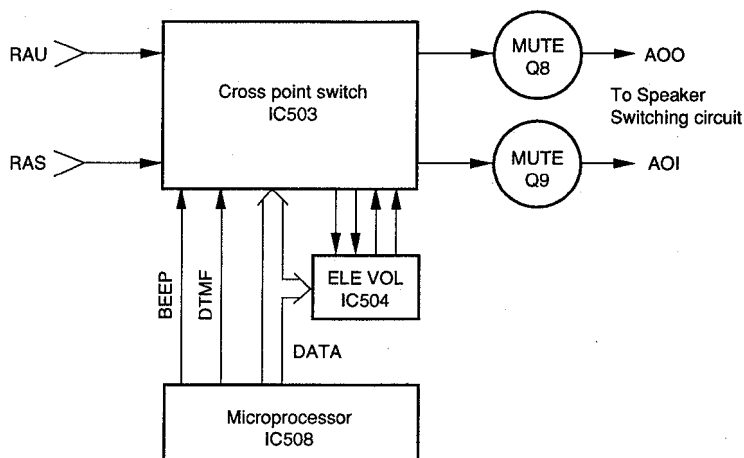

Fig.6 AF Block diagram

CIRCUIT DESCRIPTION

Digital Control Circuit

The digital control section controls each function with one microprocessor (IC508) and comprises the subtone signal, DTMF encode and DTMF decode circuit (IC506), the electronic control circuit (IC504), and the analog signal select cross point switch (IC503 and IC510) circuit. The reset and backup circuits, mic amp circuit, and microphone key input circuit are also included in the control unit.

Panel and Control Unit Data Communications

Figure 7 shows the control unit data communication circuits. SI is the serial data in and SO is the serial data out. There is an inverter for protecting the microprocessor board.

Data communication is asynchronous, with a communications speed of 3125 bps. The control unit side microprocessor checks the connection once every 0.5 second and if the connection is NG twice in a row, in other words if the panel section is removed for more than one second, the power is cut off.
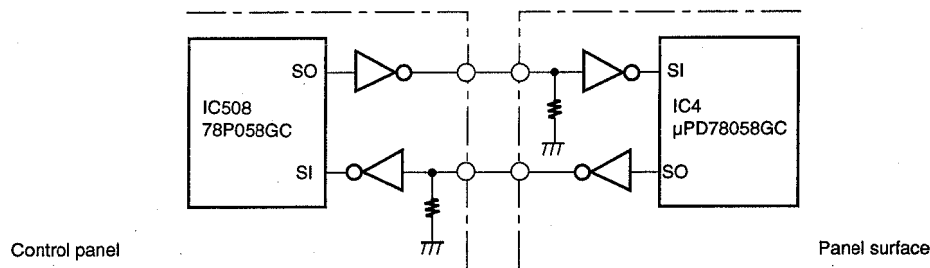

Fig.7 Panel, control unit data communications circuit

Speaker Switching Circuit

There are two speaker jacks, J1 and J2. The AF signals can be output in various combinations matching the internal speakers.

When no external speaker is connected to J1, Pins 10 and 11 of the multiplexer (IC18: XBU4053BCF) go low, the AF signals AO 0 and AO 1 from the control unit are added and input to the power amp (IC1: LA4446).

When an external speaker is connected to J1, Pins 10 and 11 of the multiplexer (IC18) go high and AO 0 and AO 1 are input separately to the power amp.

The AF signal output combinations are as in the speaker combination cable on the right.

	AO0	AO1
Internal speakers only	Internal speaker	
1 external speaker (J2)	external speaker	
1 external speaker (J1)	Internal speaker	external speaker
2 external speaker	external speaker	external speaker

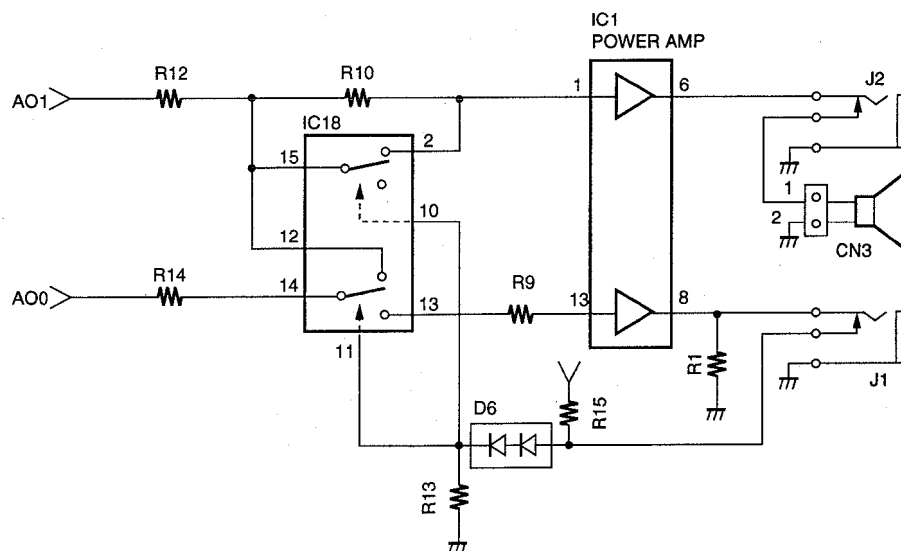**Speaker combination table**

Fig.8 Speaker switching circuit

TM-V7A/E

CIRCUIT DESCRIPTION

Tone Output Circuit

The tone signals (38 waves within 67.0 to 250.3Hz) are output from ANO0 of the microprocessor (IC408) analog output board.

DTMF Encode/Decode Circuit

●DTMF encode circuit

The DTMF signals are output from ANO1 of the microprocessor (IC508) analog output board.

●DTMF decode signals

The reception signals, the DTMF signals from a mic with DTMF (M2, E, E3 : optional), go into the DTMF decoder IC (IC506: LC73881M). When a valid tone pair is detected, STD of the DTMF decoder IC (IC506) goes high. This is input to the P56 port of the microprocessor (IC508), the serial clock is output from P54 of the microprocessor (IC508) to the DTMF decoder IC (IC506), and the serial data is sent to the P55 port of the microprocessor.
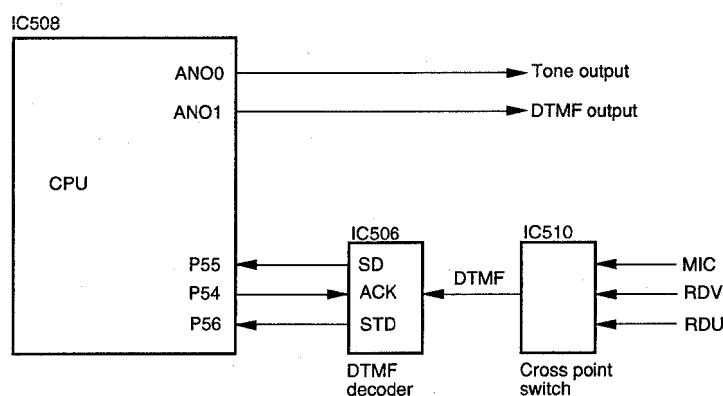

Fig.9 DTMF encode/decode circuit

Analog Signal Switching Circuit

Cross point switches (IC503 and IC510: JLC1555F) are used for AF system signal switching and RD system signal switching. These cross point switches use serial data from the microprocessor to switch analog switches arrayed in a matrix.

Audio signal switching is carried out by a cross point switch (IC503). The destination for input from MIC RD, DTMF RD, and CTCSS RD is switched to either the 144-MHz band or the 430-MHz band by a cross point switch (IC510).

●AF system signal switching
(IC503SW No. 16, 17, 20, and 21)

These switches (shown in Tables 5 and 6) output the 144MHz AF signals and 430MHz AF signals from the electrode control to either AO0 or AO1.

When SW No16 is ON, AO0- 430MHz	AF external SP output
When SW No21 is ON, AO1- 144MHz	AF internal SP output
When SW No20 is ON, AO0- 144MHz	AFexternal SP output
When SW No17 is ON, AO1- 430MHz	AF internal SP output

Table5

●Beep output switching (IC503SW No. 6 and 7)

These switches output the Beep signal from the microprocessor (IC508) to either RIN or LIN of the electronic control (IC504: MB87032APFGBND) and to the corresponding band 144 MHz or 430 MHz. (See Tables 6 and 7.)

●DTMF output switching (IC503SW No. 2 and 3)

These switches output the DTMF signals from the microprocessor (IC508) to either RIN or LIN of the electronic control (IC504) and to the corresponding band 144 MHz or 430 MHz. (See Table 6.)

CIRCUIT DESCRIPTION

●IC503

SW No.	SW name	Function
0	Not used (Always set to OFF)	
1	Not used (Always set to OFF)	
2	Controls the DTMF monitor sound (430)	"L" : OFF "H" : During monitor output
3	Controls the DTMF monitor sound (144)	"L" : OFF "H" : During monitor output
4	Not used (Always set to OFF)	
5	Not used (Always set to OFF)	
6	Controls the BEEP monitor sound (430)	"L" : OFF "H" : During BEEP output
7	Controls the BEEP monitor sound (144)	"L" : OFF "H" : During BEEP output
8	Not used (Always set to OFF)	
9	Not used (Always set to OFF)	
10	During BEEP output AF MUTE (430)	"L" : MUTE "H" : OFF
11	Not used (Always set to OFF)	

| SW No.	SW name	Function
12	Not used (Always set to OFF)	
13	Not used (Always set to OFF)	
14	Not used (Always set to OFF)	
15	During BEEP output AF MUTE (144)	"L" : MUTE "H" : OFF
16	External speaker output control (430)	"L" : OFF "H" : Output
17	Internal speaker output control (430)	"L" : OFF "H" : Output
18	Not used (Always set to OFF)	
19	Not used (Always set to OFF)	
20	External speaker output control (144)	"L" : OFF "H" : Output
21	Internal speaker output control (144)	"L" : OFF "H" : Output
22	Not used (Always set to OFF)	
23	Not used (Always set to OFF)	

Table6
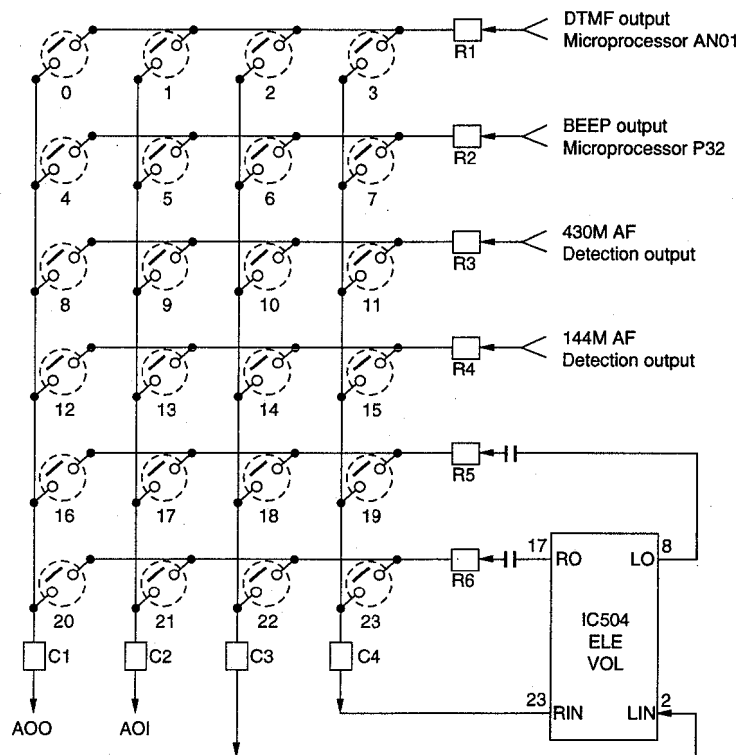
Fig.10 Cross point switch(AF system) (IC503)

TM-V7A/E

CIRCUIT DESCRIPTION

● **DTMF MIC/RD switching (IC510 SW NO. 22 and 23)**

These switch the input to the DTMF decoder (IC506: LC73881M) between DTMF signals including detection signals and DTMF signals from the mic.

● **MIC RD144/430MHz band switching (IC510 SW No. 4 and 5)**

These switch the signals output to RD of the MIC terminal to either RDU or RDS.

● **DTMF RD 144/430MHz band switching (IC407 SW No. 16 and 17)**

These switch the input to the DTMF decoder (IC506: LC73881M) to either RDU or RDS. After going through this circuit, the signals go through DTMF MIC/RD and are input to the DTMF decoder (IC506: LC73881M). When a busy detection signal (PSCU or PSCS) enters the microprocessor (IC508), the band for which the signal was detected is switched to when DTSS PAG ON. If a busy signal is detected for both bands at the same time, the band detected last is switched to.

● **CTCSS RD 144/430MHz band switching (IC510 SW No. 0 and 1)**

These switch the input to the CTCSS decoding IC (IC507:AK2343) to either RDV or RDU. When a busy signal (P SCU or P SCS) enters the microprocessor (IC508), that band is switched to when CTCSS is on. When both bands are busy, the circuit is switched every 500 ms.
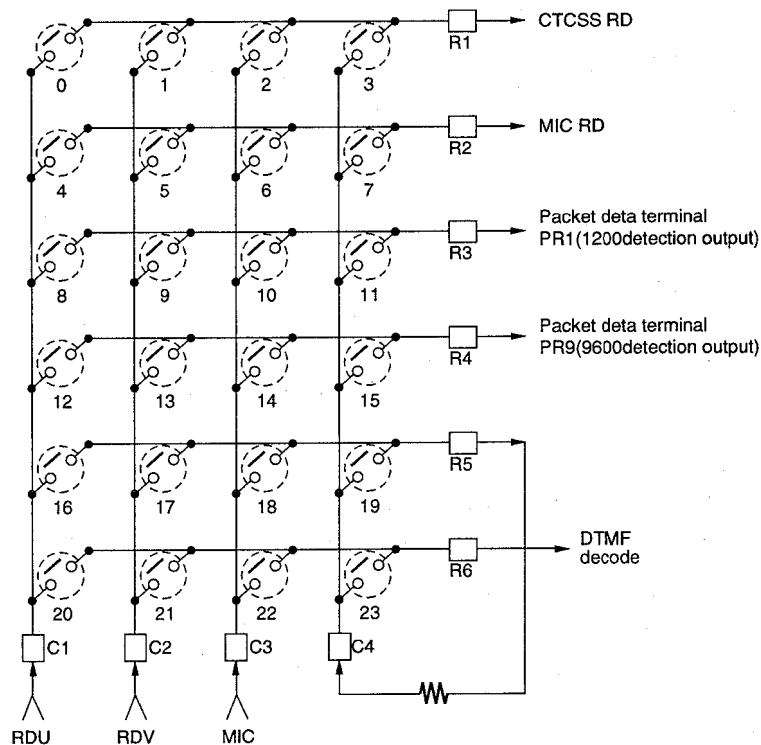

Fig.11 Cros point switch (RD system)

CIRCUIT DESCRIPTION

●IC407 (RD system)

SW No.	SW name	Function
0	CTCSS decoder input	"L" : OFF "H" : RDV connection
1	CTCSS decoder input	"L" : OFF "H" : RDU connection
2	Not used (Always set to OFF)	
3	Not used (Always set to OFF)	
4	MIC RDV squelch control	"L" : CLOSE "H" : BUSY
5	MIC RDU squelch control	"L" : CLOSE "H" : BUSY
6	Not used (Always set to OFF)	
7	Not used (Always set to OFF)	
8	MIC RDV squelch control	"L" : CLOSE "H" : BUSY
9	MIC RDU squelch control	"L" : CLOSE "H" : BUSY
10	Not used (Always set to OFF)	
11	Not used (Always set to OFF)	

SW No.	SW名	機 能
12	PTT BAND RDV control	"L" : Transmit band is 430 "H" : Transmit band is 144
13	PTT BAND RDU control	"L" : Transmit band is 144 "H" : Transmit band is 430
14	Not used (Always set to OFF)	
15	Not used (Always set to OFF)	
16	DTMF decoder input	"L" : OFF "H" : RDV connection
17	DTMF decoder input	"L" : OFF "H" : RDV connection
18	Not used (Always set to OFF)	
19	Not used (Always set to OFF)	
20	Not used (Always set to OFF)	
21	Not used (Always set to OFF)	
22	DTMF decoder switching input	"L" : RD input "H" : MIC input
23	DTMF decoder switching input	"L" : RD input "H" : MIC input

Table7

Data Terminal and Peripheral Circuits

J402 (data terminal) is the data communications terminal on the front. It handles transmission control, data input/output, and squelch signals.

There are two data communications modes: 9600bps mode and 1200bps mode. 9600bps mode communications are GMSK and G3RUH packet communications. Unlike with 1200bps AFSK, with this type of high-speed modulation, frequency modulation is carried out after the digital base band signals (rectangular wave) are passed through a band limiting filter. For 9600bps GMSK for example, compared to 4800Hz signals (nearly sine wave signals passed through a filter), these signals have a hissing sound like digital modulation when listened to by ear. Different types of modulation, such as GMSK and G3RUH, are distinguished by the type of band limiting filter.

●Transmission signals

Transmission modulation signals enter from PKD of the data terminals (J501). The path to the modulation depends on whether communications are 9600bps mode or not.

These paths are shown as Ⓐ, Ⓑ, and Ⓒ in Figure 12. When PKS of the data terminals (J402) is low, the path switches to Ⓐ and Ⓑ. When PTT is active, the path switches to Ⓒ. The modulation input levels etc. are in Table 8. For 9600bps mode, the frequency shift depends on the input signal level, so there is an amplitude limiting circuit to hold the signal below 4 Vp-p to avoid extreme shifts.

The amplitude of the PKD signal from the data terminals (J402) is limited by D506 and D507.
Thanks to this circuit, the PKD signal does not go above 4 Vp-p and the frequency shift does not fluctuate extremely.

Pin No.	Pin name	Specification		
1	PKD	bps switching	1200bps	9600bps
		Modulation input	40mVp-p	2Vp-p
		Frequency shift	3±0.5kHz	2.2±0.5kHz
4	PR9	Output level 500mVp-p/10kΩ Always output during reception		
5	PR1	Output level 500mVp-p/10kΩ Not output when squelch off		

Table8 DATA terminal input/output level

●Reception signals

PR9 is the 9600bps data communications reception output. It outputs the FM detection circuit output (RD signals) through a buffer amp (Q506: 2SC4738 (GR)). These signals are always output whether the squelch is open or closed.

PR1 is the 1200bps data communications reception output. It outputs the FM detection circuit output (RDT signals) through a buffer amp (Q508: 2SC4738 (GR)). These signals are always output whether the squelch is open or closed.

TM-V7A/E

CIRCUIT DESCRIPTION

●Squelch signal output circuit

This is the squelch output input to the TNC in order to prevent collisions in packet communications. The logic is as shown in Table 9. This is digital transistor output pulled up to 5V.

SQC terminal output (J402 pin 6)	L:SQ CLOSE H:SQ BUSY

Table9

Fig.12 DATA terminal and peripheral circuit

14

CIRCUIT DESCRIPTION

Reset and Backup Circuits

When power is supplied to the set, the reset circuit generates a delay in the reset IC (IC505: PST9130NR) and the delay signal is input to the reset terminal of the main unit microprocessor to carry out a power ON reset. When the power voltage drops, the voltage is detected and the reset signal is generated.

The reset switch circuit resets the main unit microprocessor when the reset switch (S501) is pressed. After the reset operations are carried out, the microprocessor goes to

look at the RSTSW port. If the switch is released within 1 second (if the RSTSW port is low), the operations are the same as for an ALL reset (MR + power ON). The RSTSW port is normally low. The backup circuit detects any voltage drop in the power supply voltage 13.8V line and sets INTO of the microprocessor high, causing the microprocessor to send the backup data to the EEPROM (IC512) and go into STOP mode to reduce power consumption.

Fig.13 Reset backup circuit

TM-V7A/E

CIRCUIT DESCRIPTION

Mic Amp Circuit

The audio signals from the microphone are impedance matched and enter AK2343 (IC507). AK2343 comprises a 2-stage amp, mute circuit, band pass filter circuit, limiter circuit, and splatter filter circuit. It provides the audio signal amplification and preemphasis characteristic. The mute circuit is used while transmitting DTMF signals and the like

from the microprocessor and during data transmission from the packet terminal. The modulation circuits are directly connected with the VCO variable-capacity diode for both the 144MHz band and the 430MHz band and apply frequency modulation.
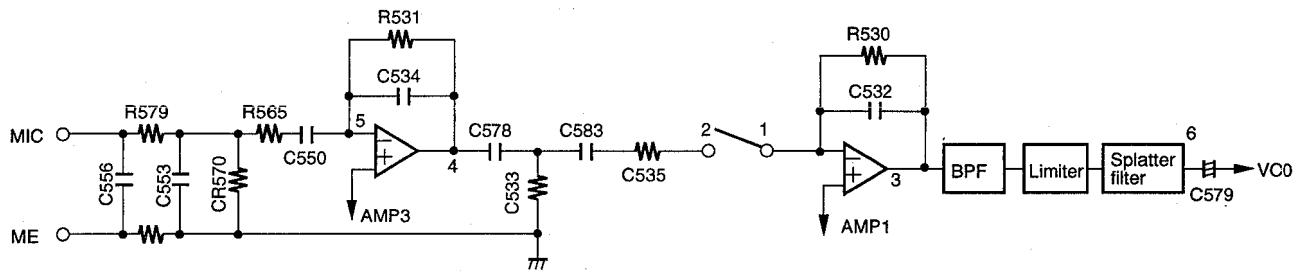
Fig.14 Mic amp circuit (IC507:AK2343)

Microphone Key Input

The microphone UP/DOWN and function keys are connected to the microprocessor analog input. The voltage when a key is ON operates the corresponding function. Also, the key input interrupt circuit is for switching the power ON/OFF with the microphone. When the DOWN, MR, and

PF keys are pressed, an interrupt is generated and the microprocessor is awoken from stop mode. However, with the TM-V7A/E, the power key is on the microphone, so the set is designed to switch on the main unit power only when the PF key is pressed and other interrupts are ignored.

Fig.15 Microphone key input circuit

16

CIRCUIT DESCRIPTION

Panel Section (LCD ASSY: B38-0772-15)

The panel section controls serial communications with the main unit control section, the key input circuit, the display circuit, and the dimmer circuit through the microprocessor (IC4).

●Serial communications circuit

A buffer is inserted in order to protect the microprocessor ports.

●Key input circuit

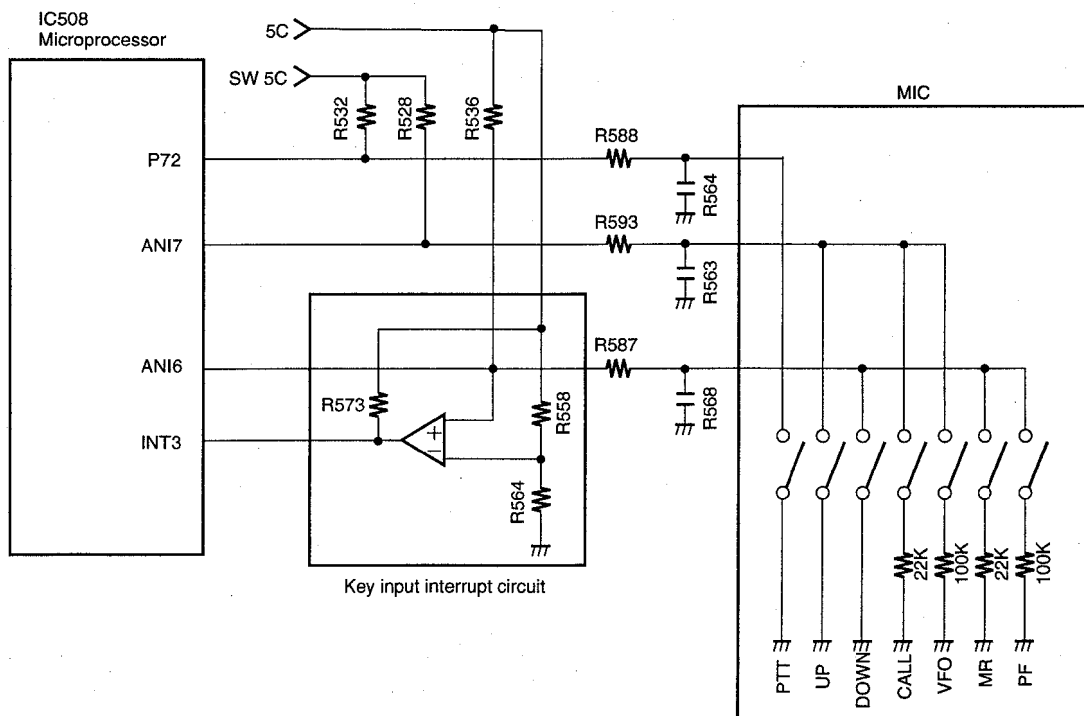There is one microprocessor port for each panel section key. The PSW key is pulled down and the other keys are pulled up with software within the microprocessor. The rotary encoder is input directly to the microprocessor.

●Display circuit

The TM-V7A/E display section is a 152x45-dot full-dot matrix LCD controlled by two LCD. As shown in Figure 16, the master IC (IC5) side is connected to 32 common dots and 80 segment dots and the slave IC (IC6) side is connected to 13 common dots and 72 segment dots. The LCD drive voltage is obtained by raising the power supply voltage (5V) within the IC. Also, the contrast level (LEBEL8) for resetting is adjusted with R19 to be optimum.
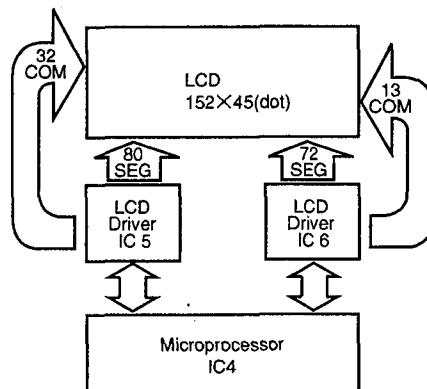
Fig.16 Display circuit

●Dimmer circuit

The dimmer circuit switches the lamp brightness to one of four levels or OFF. (See Table 10.) The current flowing to the LEDs is varied by selecting resistors from R55 to R58.

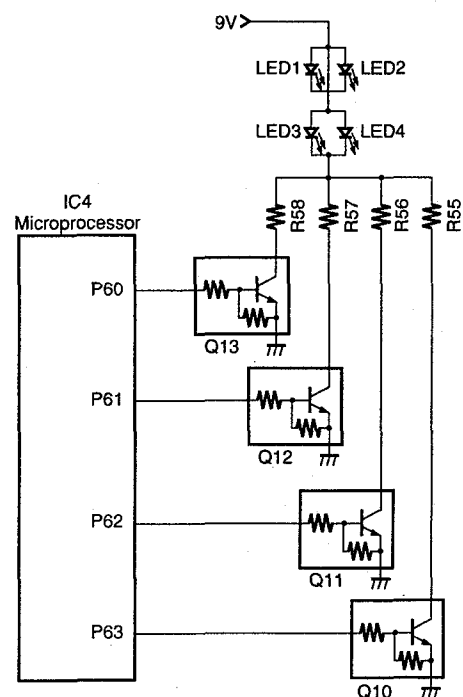| Dimmer level	P60	P61	P62	P63
1	H	L	L	L
2	L	H	L	L
3	L	L	H	L
4	L	L	L	H
OFF	L	L	L	L

Table10 Port logic

Fig.17 Dimmer circuit

TM-V7A/E

CIRCUIT DESCRIPTION

●144MHz band PLL synthesizer section

The VCO section is in the shielding case and the PLL section is on the TX-RX board. The 12.8MHz reference oscillator (X1) is oscillated with the PLL IC (IC7). The 5kHz and 6.25kHz reference frequencies are obtained by frequency dividing this signal. Part of the 12.8MHz oscillation output is also supplied to the 430MHz PLL circuit through a buffer amp.

5kHz, 10kHz, 15kHz, 20kHz, 12.5kHz, 25kHz, and 50kHz step PLL synthesizers are configured through phase comparison with the reference frequencies obtained by frequency dividing X2. For VHF-band reception, oscillation is 182.85 to 184.845MHz (E), 182.85 to 186.845MHz (K, M) and for transmission, oscillation is 144.00 to 145.995MHz (E), 144.00 to 147.995MHz (K, M). For UHF-band sub-reception, oscillation is 195.575 to 200.5725 MHz (M, E), 199.575 to 205.5725MHz (K) using double the VCO oscillation frequency as the local frequency.
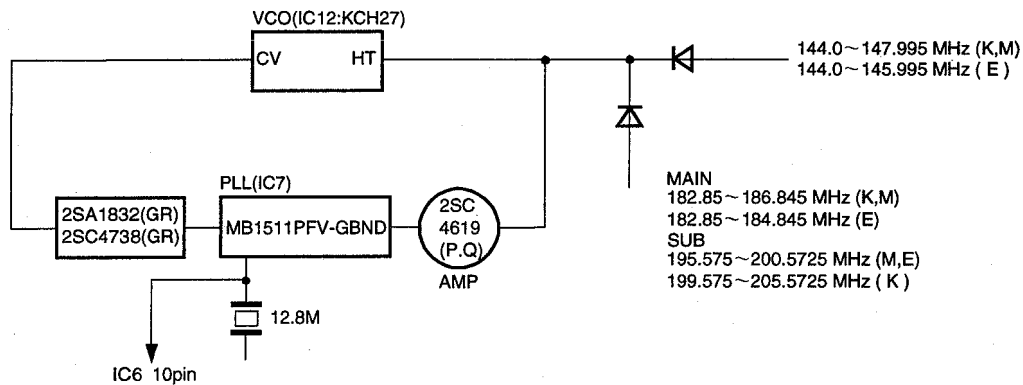
Fig.18

●430MHz band PLL synthesizer section

The VCO section is in the shielding case and the PLL section is on the TX-RX board. 5kHz, 10kHz, 15kHz, 20kHz, 12.5kHz, 25kHz, and 50kHz step PLL synthesizers are configured through phase comparison with the reference frequencies obtained by frequency dividing the 12.8MHz signal supplied from the 144MHz band PLL circuit.

For UHF band reception, oscillation is 384.95 to 394.945MHz (M, E), 392.95 to 404.945MHz (K) and for transmission, oscillation is 430 to 439.995MHz (M, E), 438.00 to 449.995MHz (K). For VHF-band sub-reception, oscillation is 378.1 to 382.09MHz (E), 378.1 to 386.09MHz (K, M) using double the VCO oscillation frequency as the local frequency.
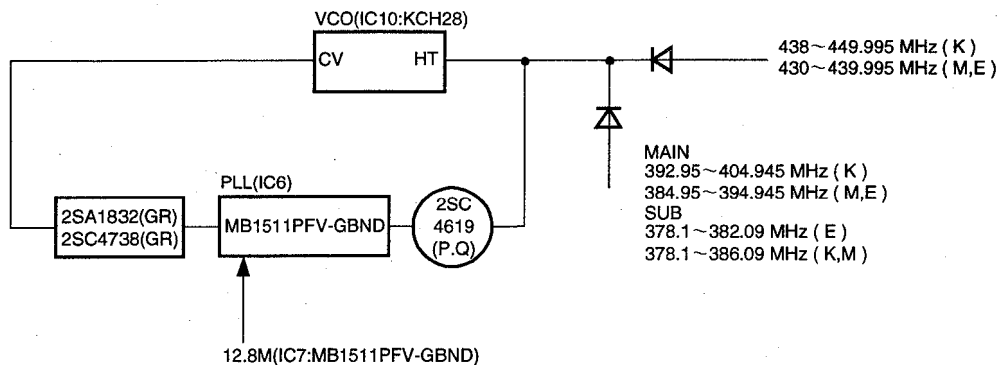

Fig.19

SEMICONDUCTOR DATA

I/O Port Specifications
UPD78058GC-468 (LCD ASSY:IC4)

Pin No.	Pin code	I/O	Function	Active level
1	P15/AN15	I		
2	P16/AN16	I	Connected to Vss	
3	P17/AN17	I		
4	AVss		A/D converter reference ground	
5	P_LCDLE	O	LCD driver latch enable	
6	P131/AN01	I	Connected to Vss	
7	AVREF1		Connected to VDD	
8	P70/RXD	I		
9	P71/TXD	I	Connected to Vss	
10	P72/ASCK	I		
11	P_LCDRST	O	LCD driver reset	
12	P_LCDDI	O	LCD driver data select (AO)	
13	P_LCDWR	O	LCD driver write select	
14	P_LCDCE1	O	LCD driver chip select 1	
15	P_LCDCE2	O	LCD driver chip select 2	
16	P_SI	I	Common microprocessor SO	
17	P_SO	O	Common microprocessor SI	
18	P27/SCK0	I/O	Not used (Open)	
19	P_LCDDT0	O	LCD driver data line 0	
20	P_LCDDT1	O	LCD driver data line 1	
21	P_LCDDT2	O	LCD driver data line 2	
22	P_LCDDT3	O	LCD driver data line 3	
23	P_LCDDT4	O	LCD driver data line 4	
24	P_LCDDT5	O	LCD driver data line 5	
25	P_LCDDT6	O	LCD driver data line 6	
26	P_LCDDT7	O	LCD driver data line 7	
27	P_LED5	O	LED5 CLF dark lighting	
28	P51/A9	I	Connected to Vss	
29	P52/A10	I		
30	P_5CSW	O	SW 5C control	
31	P54/A12	I	Connected to Vss	
32	P55/A13	I		
33	Vss		Microprocessor ground	
34	P56/A14	I	Connected to Vss	
35	P57/A15	I		
36	P60	I	Connected to VDD	
37	P61	I		
38	P62	I		
39	P63	I		
40	P64/RD	O	Connected to Vss	
41	P65/WR	O		
42	P66/WAIT	I		
43	P67/ASTB	I		
44	P_DIM	O	CFL dimmer adjustment	
45	P31/TO1	I	Connected to Vss	
46	P_KEY9	I	PM KEY	L
47	P_KEY10	I	MENU KEY	L
48	P_KEY11	I	CONT KEY	L
49	P_PCL	O	LCD driver clock	
50	P_KEY12	I	B. SEL KEY (VHF)	L
51	P_KEY13	I	B. SEL KEY (UHF)	L
52	P_KEY1	I	VFO KEY	L
53	P_KEY2	I	MR KEY	L
54	P_KEY3	I	CALL KEY	L

TM-V7A/E

SEMICONDUCTOR DATA

Pin No.	Pin code	I/O	Function	Active level
55	P_KEY4	I	MHz KEY	L
56	P_KEY5	I	F KEY	L
57	P_KEY6	I	TONE KEY	L
58	P_KEY7	I	REV KEY	L
59	P_KEY8	I	LOW KEY	L
60	RESET	I	Reset input	
61	P_ENCCK	I	Encoder clock (encoder A signal)	
62	P_INT1	I	Connected to P_SI	
63	P_PWR	I	Power switch	
64	P_ENCDT	I	Encoder data (encoder B signal)	
65	P_BCHK	I	Power voltage check	
66	P05/INTP5	I	Connected to Vss	
67	P06/INTP6	I		
68	VDD		Microprocessor power	
69	X2		Clock oscillator connection (4.19M)	
70	X1			
71	IC (VPP)			
72	XT2			
73	XT1/P07			
74	AVDD		A/D converter analog power	
75	AVREF		A/D converter reference voltage	
76	P_SQLU	I	430MHz band squelch input	
77	P_VOLU	I	430MHz band volume input	
78	P_SQLV	I	144MHz band squelch input	
79	P_VOLV	I	144MHz band volume input	
80	P14/AN14	I	Connected to Vss	

78P058GCJRHC : K   TX-RX (CONT):IC508
JRJC : E, M

Pin No.	Pin code	I/O	Function	Active level
1	P_SCU	I	Squelch input (UHF)	
2	P_DWAN	I	MIC DOWN, MR, PF	
3	P_UPAN	I	MIC UP, CALL, VFO	
4	AVss		A/D converter reference ground	
5	P_TONE	O	Sub-tone output	
6	P_DTMF	O	DTMF output	
7	AVREF1			
8	P_RXD	I	TNC RXD/P_PKS	
9	P_TXD	O	TNC TXD/P_SQ	
10	P_PTT	I	MIC PTT	L
11	P_EPV	O	PLL enable (VHF)	
12	P_CKV	O	PLL, shift register clock (VHF)	
13	P_DTV	O	PLL data (VHF)	
14	P_ULKU	I	PLL unlock detection (UHF)	
15	P_ULKVU	I	PLL unlock detection (VHF)	
16	P_SI	I	Panel microprocessor SO	
17	P_SO	O	Panel microprocessor SI	
18	P27/SCK0	I/O	Not used (Open)	
19	P_ESM	O	External speaker mute	H
20	P_ISM	O	Internal speaker mute	H
21	P_EPU	O	PLL enable (UHF)	
22	P_CKU	O	PLL, shift register clock (UHF)	
23	P_DTU	O	PLL data (UHF)	
24	P_ESU	O	Shift register clock (UHF)	

20

SEMICONDUCTOR DATA

Pin No.	Pin code	I/O	Function	Active level
25	P_ESV	O	Shift register data (VHF)	
26	P_PSW	O	Power switch	H
27	P_STP2	O	Cross point switch latch (AF)	
28	P_DTP	O	Cross point switch data	
29	P_CKP	O	Cross point switch clock	
30	P_STP1	O	Cross point switch latch (RD)	
31	P_CKD	O	DTMF decoder clock	
32	P_DTD	I	DTMF decoder data	
33	Vss		Microprocessor ground	
34	P_STD	I	DTMF decoder detection	
35	P_5CSW	O	5C SW control	L
36	P_B0	I	Destination bit 0	
37	P_B1	I	Destination bit 1	
38	P_B2	I	Destination bit 2	
39	P_B3	I	Destination bit 3	
40	P_SOE	I	EEPROM SO	
41	P_CSE	O	EEPROM chip select	
42	P_CKE	O	EEPROM clock	
43	P_SIE	O	EEPROM SI	
44	P_APC	O	APC control	
45	P_PSEL	I	Packet connection check	
46	P_BEEP	O	BEEP output	
47	P_9600	O	9600bps	
48	P_1200	O	1200bps	
49	P_DMONI	O	DTMF monitor ON/OFF	
50	P_1750	O	1750Hz tone	
51	P_RRM	O	Repeater RD mute	H
52	P_RPT	I	Repeater alteration	
53	P_NAR	I	Audio composite IC serial input enable	
54	P_RST	O	Audio composite IC reset	
55	P_VCS	O	Audio composite IC chip select	
56	P_DTC	O	CTCSS data/audio composite IC data	
57	P_CKC	I/O	CTCSS clock/audio composite IC clock connection check	
58	P_SDO	I	CTCSS detection	H
59	P_STC	O	CTCSS enable	
60	RESET	I	Reset input	H
61	P_CHD	I	Channel display jumper	
62	P_BCHK	I	Power check	H
63	P_INTP2	I	Connected to P_SI	L
64	P_INTP3	I	Connected to P_DWAN	L
65	P_CKVR	O	Electronic control colck	
66	P_ENVR	O	Electronic control enable	
67	P_DTVR	O	Electronic control data	
68	VDD		Microprocessor power	
69	X2		Clock oscillator connection (4,19M)	
70	X1			
71	IC(VPP)		Vss	
72	XT2		Open	
73	XT1/P07		Vss	
74	AVDD		A/D converter analog power	
75	AVREF		A/D converter reference voltage	
76	P_SCV	I	Squelch input (VHF)	
77	P_SMV	I	S meter input (VHF)	
78	P_SMU	I	S metert input (UHF)	
79	P_AFMUTE	O	AF MUTE	
80	P_TCX0	I	TCXO voltage input	

TM-V7A/E

SEMICONDUCTOR DATA

●Schematic diagram KCH27 (TX-RX : IC12) : HIC (VHF VCO)

Q1: DTC114YE
Q2: 2SK1875 (V)
Q3: 2SC5108 (Y)

D1: MA2S304
D2: MA2S304
D3: HVC351
D4: MA2S077
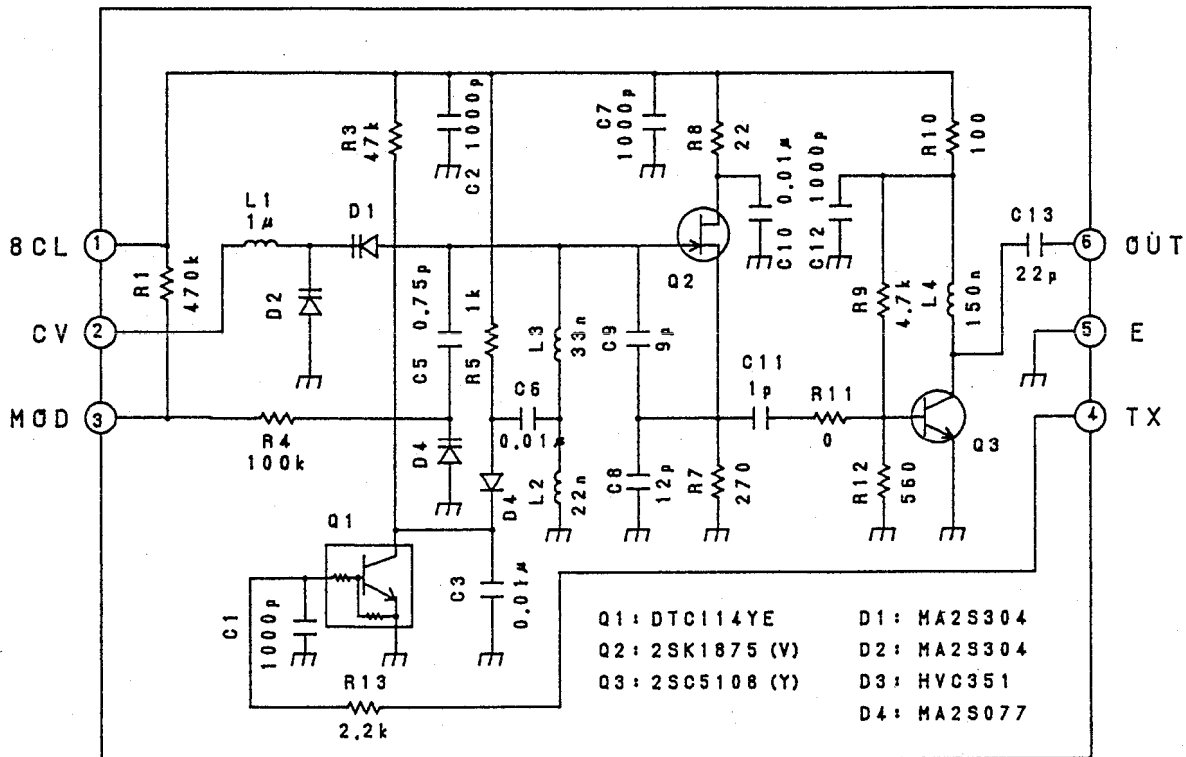
●Schematic diagram KCH28 (TX-RX : IC10) : HIC (UHF VCO)

Q1: DTC114YE
Q2: 2SK508NV (K52)
Q3: 2SC5108 (Y)
D1: 1SV283
D2: 1SV283
D3: MA2S077
D4: HVC351
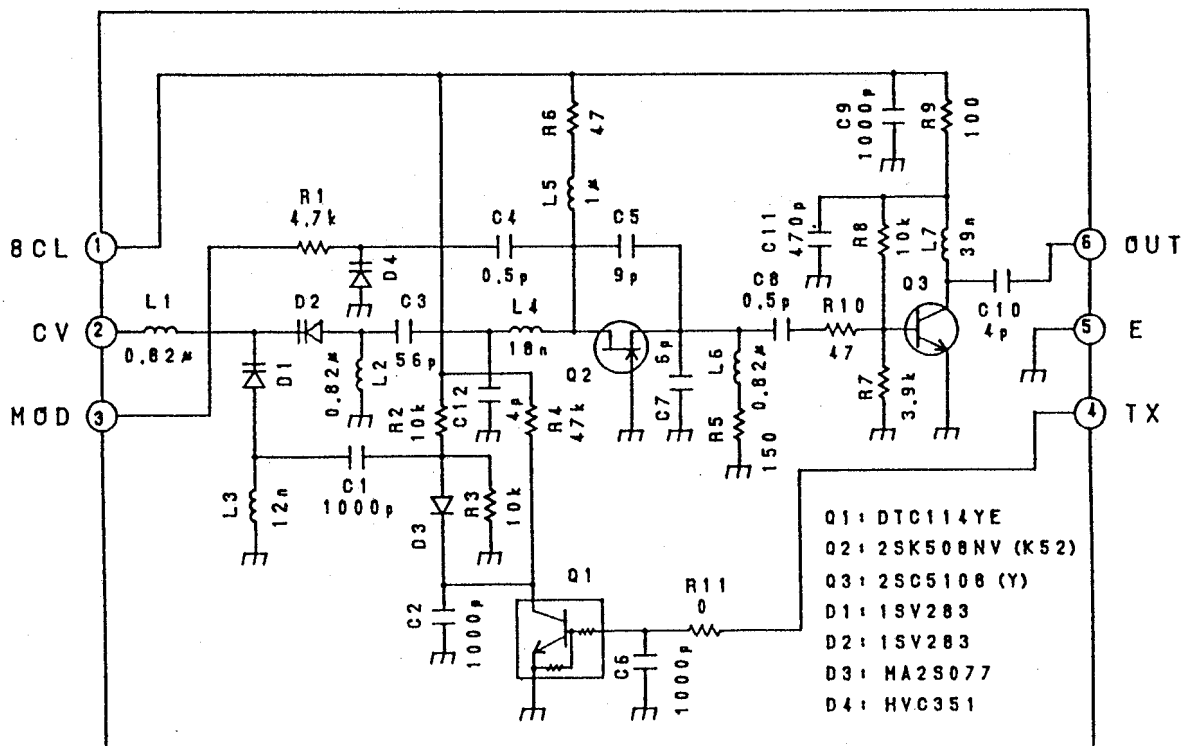
DESCRIPTION OF COMPONENTS

TX-RX UNIT (X57-52XX-XX : A/3)
CONTROL UNIT (X57-52XX-XX : B/3)

Ref No.	Use/Function	Operation/condition/Compatibility
Q1	Power select switch	ON for 430MHz reception
Q2	Power select switch	ON for 144MHz transmission
Q3	Power select switch	ON for main 144MHz reception/ON for 430MHz sub-reception
Q7	Power select switch	ON for 430MHz reception
Q8	Speaker output mute	ON for internal speaker
Q9	Speaker output mute	ON for external speaker
Q10	Power select switch	ON for 430MHz transmission
Q11	High-frequency amplification	Operates for main 144MHz reception
Q12	Buffer	12.8M
Q15	F IN amp	430M
Q16	Power select switch	ON for 800MHz reception (Except K type) /ON for main 430MHz reception
Q17	Power select switch	ON for 430MHz pass through/ON for 144MHz sub-reception
Q19	Amp	12.8M
Q20	F IN amp	144M
Q21	High-frequency amplification	Operates for main 144MHz reception
Q23	High-frequency amplification	Operates for main 430MHz reception
Q24, 25	Charge pump	430M
Q26	Filter switch	430MHz sub-reception
Q27	First mixer switch	ON for main 144MHz reception
Q28	First mixer	Operates for main 144MHz reception
Q29, 30	Charge pump	144M
Q31	First mixer switch	ON for 430MHz sub-reception
Q32	First mixer	Operates for 430MHz sub-reception
Q33	Modulation muting	430M
Q34	High-frequency amplification	Operates for main 430MHz pass through
Q35	Modulation muting	144M
Q36	PLL 8V ripple filter	
Q37	High-frequency amplification	Operates for main 430MHz reception
Q38	CV line buffer	
Q39	First mixer switch	ON for 144MHz sub-reception
Q40	First IF amplification	
Q41	PLL 8V ripple filter	
Q42	Power switch	For 430M through
Q43	Q40 gain control	AM AGC
Q44	First mixer	Operates for 144MHz sub-reception
Q45	VCO-PLL output amplification	430M
Q46	VCO-PLL output amplification	144M
Q47	Main 144M reception power	
Q48	First mixer switch	ON for main 430MHz reception
Q49	High-frequency amplification	Operates for 800MHz reception (Except K type)
Q50	First mixer	Operates for main 430MHz reception
Q51	High-frequency amplification	Hetero amplification for 800MHz reception (Except K type)
Q52	First mixer	Operates for 800MHz reception (Except K type)
Q53	Transmission driver	430M transmission
Q54	First mixer switch	ON for 800MHz reception (Except K type)
Q55	First IF amplification	
Q56	Transmission driver	144M transmission
Q57	Transmission driver	430M transmission
Q58	Noise amp	144M
Q60	Transmission driver	430M transmission

TM-V7A/E

DESCRIPTION OF COMPONENTS

Ref No.	Use/Function	Operation/Condition/Compatibility
Q61	Transmission driver	144M reception
Q63	Noise amp	430MHz
Q66, 67	APC control	
Q69	Power switch	
Q71	Power switch control	
Q73	RD buffer	144MHz
Q74	RD buffer	430MHz
Q75	FAN switch	
Q76	Constant voltage circuit	10V
Q77	Switch	Overvoltage protection
Q78	Constant voltage circuit	10V
Q81	Temperature protection switch	
Q91	Switch	AM select
Q501	Back up switch	
Q504	5C feed switch	
Q505	MIC RD buffer amp	
Q506	9600bps RD buffer amp	
Q507	MIC RD mute	
Q508	1200bps RD buffer amp	
Q509	Reset switch	
IC1	AF amplification	
IC2	8V AVR	
IC3	VHF band transmission driver	
IC4	UHF band transmission driver	
IC6	PLL frequency synthesizer	430MHz
IC7	PLL frequency synthesizer	144MHz
IC8	Analog switch	430MHz loop filter switching
IC9	Analog switch	144MHz loop filter switching
IC10	VCO-PLL	
IC11	Frequency divider (prescaler)	
IC12	VCO-PLL	
IC13	Second local oscillation, mixer, IF amplification, detection, low-frequency amplification, noise amplification, noise detection, squelch switching	
IC14	Multiplexer	
IC15	Second local oscillation, mixer, IF amplification, detection, low-frequency amplification, noise amplification, noise detection, squelch switching	
IC16	APC control	
IC17	5V AVR	
IC18	Multiplexer	
IC19, 20	Serial-parallel conversion	
IC501	6V AVR	
IC502	5V AVR	
IC503	Cross point switch	
IC504	Electronic control	
IC505	Reset IC	
IC506	DTMF decoding	
IC507	Mic amp, tone decoding	
IC508	MPU	
IC509	Analog switch	
IC510	Cross point switch	

DESCRIPTION OF COMPONENTS

Ref No.	Use/Function	Operation/Condition/Compatibility
IC511	Low frequency amplification	
IC512	EEPROM	
IC513	Multiplexer	
D1	Voltage compensation	
D4, 5	Variable capacity diode tuning	
D7	For lock detector rectification	For 430MHz
D8	Lock detector	For144MHz
D9	Filter switch	For 430MHz-sub
D10, 11	Variable capacity diode tuning	
D12	Loop filter switch	For430MHz
D13, 14	Variable capacity diode tuning	
D15	High-frequency switch	
D16	Loop filter switch	For 144MHz
D17	High-frequency switch	
D18	Hetero switch	
D19	Constant voltage circuit	For frequency divider
D20	Speeds rise of Q36	
D21	Hetero switch	
D22	High-frequency switch	
D23	Speeds rise of Q41	
D24	Power switch	
D25 ~ 27	Hetero switch	
D28	Temperature assurance	For 144MHz
D29	Power switch	
D30	Temperature assurance	For 144MHz
D31	Temperature assurance	430M driver
D32	Noise amp detection	For 144MHz
D33, 34	Antenna switch	For 430MHz
D35, 36	Antenna switch	For 144MHz
D37	APC power detection	Operates for 430MHz transmission
D38	Noise amp detection	For 430MHz
D39	APC power detection	Operates for 430MHz transmission
D40	Transmission control	
D41, 42	APC power detection	Operates for 144MHz transmission
D43	Power reverse connection protection	
D44 ~ 47	Hetero switch	
D48	Constant voltage circuit	10V
D49	Switch	Overvoltage protection
D50	Antenna switch	For 144MHz
D51	Reverse power connection prevention	
D52	Antenna switch	430MHz
D501-505	Backflow prevention	
D502	Backup detection	
D508	Switch	For hardware reset
D509	Power feed	For PC control

TM-V7A/E

TERMINAL FUNCTION

TX-RX UNIT (X57-52XX-XX: A/3)

CN No.	Pin No.	Name	Function
CN1	1	Not used	
	2	Not used	
	3	E	GND
	4	E	GND
	5	APC	APC reference voltage input
	6	ULV	VHF band unlock detection output
	7	ULU	UHF band unlock detection output
	8	DTPV	VHF PLL data input
	9	CKV	VHF PLL, shift register (IC20) clock input
	10	EPV	VHF PLL enable input
	11	E	GND
	12	MOU	UHF modulation input
	13	MOV	VHF modulation input
	14	E	GND
	15	E	GND
	16	AOI	Internal speaker audio signal input
	17	AOO	External speaker audio signal input
	18	E	GND
	19	RAU	UHF band audio output
	20	RAV	VHF band audio output
CN2	1	E	GND
	2	PB	Panel power output
	3	B	13.8V
	4	PSW	Power switch control input
	5	PE	Panel graound
	6	8C	8V common
	7	RDU	UHF band demodulated audio output
	8	RDV	VHF band demodulated audio output
	9	E	GND
	10	SQU	UHF band squelch voltage output
	11	SQV	VHF band squelch voltage output
	12	SMV	VHF band S meter voltage output
	13	SMU	UHF band S meter voltage output
	14	Not used	
	15	DTSV	Shift register (IC20) data input
	16	DTSU	Shift register (IC19) data input
	17	DTPU	UHF band PLL data input
	18	CKU	Shift register (IC19) clock input
	19	EPU	UHF band PLL enable input
	20	E	GND
CN3	1		Speaker output
	2		GND
CN4	1	FAN	FAN SB output
	2		GND

TERMINAL FUNCTION

CONTROL UNIT (X57-52XX-XX: B/3)

CN No.	Pin No.	Name	Function
CN502	1	E	GND
	2	PB	Panel power input
	3	B	13.8V
	4	PSW	Power switch control output
	5	PE	Panel ground
	6	8C	8V common
	7	RDU	UHF band demodulated audio input
	8	RDV	VHF band demodulated audio input
	9	E	GND
	10	SQU	UHF band squelch voltage input
	11	SQV	VHF band squelch voltage input
	12	SMV	VHF band S meter voltage input
	13	SMU	UHF band S meter voltage input
	14	Not used	
	15	DTSV	Shift register (IC20) data output
	16	DTSU	Shift register (IC19) data output
	17	DTPU	UHF band PLL data output
	18	CKU	Shift register (IC19) clock output
	19	EPU	UHF band PLL enable output
	20	E	GND
CN503	1	Not used	
	2	Not used	
	3	E	GND
	4	E	GND
	5	APC	APC regerence voltage output
	6	ULV	VHF band unlock detection output
	7	ULU	UHF band unlock detection output
	8	DTPV	VHF PLL data output
	9	CKV	VHF PLL, shift register (IC20) clock output
	10	EPV	VHF PLL enable output
	11	E	GND
	12	MOU	UHF modulation output
	13	MOV	VHF modulation output
	14	E	GND
	15	E	GND
	16	AOI	Internal speaker audio output
	17	AOO	External speaker audio output
	18	E	GND
	19	RAU	UHF band audio input
	20	RAV	VHF band audio input
CN504	1	VCK	VS-3 clock output
	2	VDT	VS-3 data output
	3	VCS	VS-3 chip select
	4	RST	VS-3 reset output
	5	NAR	VS-3 input enable output
	6	E	GND
	7	5C	5V common
	8	VO	Audio output
CN501	1	PSI	Serial data input
	2	PSO	Serial data output
	3	PE	Panel Ground
	4	PB	Panel power output

TM-V7A/E

TERMINAL FUNCTION

CN No.	Pin No.	Name	Function
CN701	1	E	GND
	2	SQU	UHF band squelch output
	3	VOLU	UHF band volume output
	4	SWU	UHF band select switch output
	5	Vcc	Reference voltage output
	6	SQV	VHF band squelch output
	7	VOLV	VHF band volume output
	8	SWV	VHF band select switch output
	9	E	GND

LCD ASSY (B38-0772-15)

CN No.	Pin No.	Name	Function
CN1	1	PSO	Serial data output
	2	PSI	Serial data input
	3	PE	Panel ground
	4	PB	Panel power
CN2	1	E	GND
	2	SQU	UHF band squelch input
	3	VOLU	UHF band volume input
	4	SWU	UHF band select switch input
	5	Vcc	Reference voltage input
	6	SQV	VHF band squelch input
	7	VOLV	VHF band volume input
	8	SWV	VHF band band select switch input
	9	E	GND

PARTS LIST

* New Parts. △indicates safety critical components.
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

L: Scandinavia	K: USA	P: Canada
Y: PX (Far East, Hawaii)	T: England	E: Europe
Y: AAFES (Europe)	X: Australia	M: Other Areas

TM-V7A/E

TX-RX UNIT (X57-52XX-XX)

Ref. No.	Adrress	New parts	Parts No.	Description	Destination
			TM-V7A/E		
.1	3B	*	A01-2121-13	METALLIC CABINET (LOWER)	
2	1B	*	A01-2122-13	METALLIC CABINET (UPPER)	
3	3A	*	A22-0798-11	SUB PANEL	
4	3A	*	A62-0492-33	PANEL ASSY	
5	3B	*	A82-0026-11	BACK PANEL	
6	3A	*	B10-1270-12	FRONT GLASS	
8		*	B30-2160-08	LED (BLUE)	
9	3A	*	B38-0772-15	LCD ASSY	
11		*	UPD78058GC-468	IC(CPU:LCD ASSY IC4)	
15			B46-0310-03	USER & WARRNTY CARD ACSY	E,E3
16			B46-0410-40	USER & WARRNTY CARD ACSY	K
17		*	B62-0678-00	INSTRUCTION MANUAL ACSY	K,M2,M3,E
18		*	B62-0679-00	INSTRUCTION MANUAL ACSY	E
19		*	B62-0680-00	INSTRUCTION MANUAL ACSY	E,E3
20		*	B62-0681-00	INSTRUCTION MANUAL ACSY	M3,E3
21		*	B62-0682-00	INSTRUCTION MANUAL ACSY	E3
22		*	B62-0683-00	INSTRUCTION MANUAL ACSY	M2
23		*	B62-0715-00	INSTRUCTION MANUAL ACSY	E3
24	1B		B72-0651-14	MODEL NAME PLATE	E3
24	1B	*	B72-1175-04	MODEL NAME PLATE	K
24	1B	*	B72-1176-04	MODEL NAME PLATE	M2,M3
24	1B	*	B72-1177-14	MODEL NAME PLATE	E,E3
25	1B		E04-0167-05	RF COAXIAL CABLE RECEPTACLE(M)	K,M2,M3
25	1B		E04-0170-05	RF COAXIAL CABLE RECEPTACLE(N)	E,E3
26			E30-2111-15	DC CORD ACSY	
27	1B		E30-2137-15	DC CORD	
-			E30-3206-08	MIC CURL CABLE(to SERVICE)	
29	1B		E31-3197-15	INSIDE CONNECTING WIRE(SP)	
30	2A	*	E37-0632-05	FLAT CABLE (20P)	
31		*	E40-5413-05	PIN CONNECTOR FOR INSIDE(9P)	
32			E40-5653-05	PIN CONNECTOR FOR INSIDE(4P)	
33	2A	*	F07-1428-23	COVER (DIN 6P)	
34	1B	*	F07-1429-03	COVER (FAN)	
37	2B	*	F10-2236-04	SHIELDING PLATE	
38			F51-0017-05	FUSE (15A) ACSY	
39	1B		F51-0017-05	FUSE (15A)	
40			F51-0018-05	FUSE (20A) ACSY	
41	2A		G02-0726-04	FLAT SPRING(CONT)	
42	1B	*	G02-0803-03	FLAT SPRING(AF AMP,AVR)	
-.		*	G02-0808-04	FLAT SPRING	
44	3B	*	G09-0434-14	SPRING(RELEASE)	
46	2B,3A	*	G10-0792-14	AUXILIARY PART(SP)	
47	2A	*	G10-0793-14	SHEET	
48	3B	*	G10-0794-14	SHEET	
49		*	G10-0795-04	SHEET	
50		*	G10-0796-04	SHEET	
51	1B	*	G11-0778-04	RUBBER CUSHION	
52	2A	*	G11-0779-04	SHEET	
53	3B	*	G11-0794-14	SHEET	

Ref. No.	Adrress	New parts	Parts No.	Description	Destination
54	3A	*	G11-0795-14	SHEET	
55		*	G11-0796-04	SHEET	
56	3A	*	G13-1573-24	CUSHION(PWR,CALL)	
57	2B	*	G13-1602-04	CUSHION	
58		*	H10-6608-01	FOAM PACKING MOLD	
59		*	H11-0890-04	POLYSTYRENE FOAMED BOARD	
60			H25-0103-04	BAG	
61			H25-0337-04	BAG	
62			H25-0723-04	BAG	
63		*	H52-0920-02	ITEM CARTON CASE	K
63		*	H52-0921-02	ITEM CARTON CASE	M2,M3
63		*	H52-0922-02	ITEM CARTON CASE	E,E3
65		*	J29-0632-03	BRACKET ACSY	
66	3A	*	K27-3164-13	KNOB (4+1KEY)	
67	3A	*	K27-3165-03	KNOB (PWR,CALL)	
68	3A	*	K27-3166-23	KNOB (VFO)	
69	3A	*	K27-3167-23	KNOB (MR)	
70	3A	*	K27-3168-23	KNOB (PM)	
71	3A	*	K27-3169-33	KNOB (MNU)	
72	3B	*	K27-3170-03	LEVER KNOB(RELEASE)	
73	3A	*	K27-3172-03	BUTTON KNOB(MAIN PUSH)	
74	3A	*	K29-5133-03	KNOB (MAIN)	
75	3A	*	K29-5134-03	KNOB (VOL)	
76	3A	*	K29-5135-03	KNOB (SQL)	
A	3A		N14-0569-04	NUT (VOL)	
B	1B,3B		N33-2606-45	OVAL HEAD MACHIN SCREW(CASE)	
C	2B,3B		N67-3008-46	PAN HEAD SEMS SCREW(MODULE)	
D	3B		N80-2010-45	SCREW(PANEL)	
E	1B		N80-2610-45	SCREW(FAN COVER)	
F	2A		N83-2005-46	SCREW(SUB PANEL)	
G	1B,2B		N83-2608-46	BRAZIER HEAD TAPTITE SCREW(APC)	
H	2B		N87-2606-46	BRAZIER HEAD TAPTITE SCREW(PCB)	
77			N99-0331-05	SCREW SET ACSY	
78			S70-0408-05	TACT SWITCH	
79			S70-0439-05	TACT SWITCH	
SP	1B		T07-0331-05	LOUDSPEAKER(FULLRANGE)	
80	1B		T42-0311-15	FAN MOTOR	
MIC			T91-0396-05	MICROPHONE ACSY	M2,E,E3
MIC			T91-0568-05	MICROPHONE(DTMF) ACSY	K,M3
81		*	W02-1921-05	ENCODER	

TX-RX UNIT (X57-5230-XX, X57-5270-XX:S) 0-11:K 0-22:M2, M3 2-71:E, E3					
C1			CC73GCH1H101J	CHIP C 100PF J	
C2			CK73GB1H102K	CHIP C 1000PF K	
C3			C92-0610-05	ELECTR 47UF 16WV	
C4			CE04EW1H470M	ELECTRO 47UF 50WV	
C5			CK73GB1C393K	CHIP C 0.039UF K	

TX-RX UNIT   S : Singapore made

PARTS LIST

TX-RX UNIT (X57-52XX-XX)

Ref. No.	Adress	New parts	Parts No.	Description		Destination
C6			C92-0558-05	CHIP-ELE	100UF 16WV	
C7			CE04EW1H470M	ELECTRO	47UF 50WV	
C8			CK73GB1C393K	CHIP C	0.039UF K	
C9			C92-0610-05	ELECTRO.	47UF 16WV	
C10			CE04EW1C471M	ELECTRO	470UF 16WV	
C11			CK73GB1C104K	CHIP C	0.10UF K	
C12			CE04EW1C471M	ELECTRO	470UF 16WV	
C13			CK73GB1C104K	CHIP C	0.10UF K	
C14,15			C92-0610-05	ELECTRO	47UF 16WV	
C16			CC73GCH1H330J	CHIP C	33PF J	
C17			CK73FB1A105K	CHIP C	1.0UF K	
C18			CK73GB1E103K	CHIP C	0.010UF K	
C19			CC73GCH1H060D	CHIP C	6.0PF D	
C20			C93-0568-05	CHIP C	47PF J	
C21			CK73FB1A105K	CHIP C	1.0UF K	
C22			CK73GB1H103K	CHIP C	0.010UF K	
C23			C92-0558-05	CHIP-ELE	100UF 16WV	
C24,25			CK73GB1H102K	CHIP C	1000PF K	
C26			CK73FF1C105Z	CHIP C	1.0UF Z	
C28,29			CK73GB1H102K	CHIP C	1000PF K	
C30			CC73GCH1H010C	CHIP C	1.0PF C	
C31			C92-0610-05	ELECTRO	47UF 16WV	
C32			CK73GB1H102K	CHIP C	1000PF K	
C33			CK73GB1E103K	CHIP C	0.010UF K	
C35			C93-0557-05	CHIP C	7.0PF D	
C37,38			CK73GB1H102K	CHIP C	1000PF K	
C39			CC73GCH1H020C	CHIP C	2.0PF C	
C44			CK73GB1H102K	CHIP C	1000PF K	
C45			CC73GCH1H040C	CHIP C	4.0PF C	
C46			CK73GB1H102K	CHIP C	1000PF K	
C47			CC73GCH1H030C	CHIP C	3.0PF C	
C48			CK73GB1E103K	CHIP C	0.010UF K	
C49			CK73GB1E223K	CHIP C	0.022UF K	
C50			CK73GB1H102K	CHIP C	1000PF K	
C51			CK73GB1E103K	CHIP C	0.010UF K	
C52			CC73GCH1H100D	CHIP C	10PF D	
C53			CK73GB1E103K	CHIP C	0.010UF K	
C54			CK73GB1H102K	CHIP C	1000PF K	
C55			CC73GCH1H040C	CHIP C	4.0PF C	
C56			CK73GB1C104K	CHIP C	0.10UF K	
C58			CC73GCH1H100D	CHIP C	10PF D	
C59			CK73GB1C473K	CHIP C	0.047UF K	
C60			CC73GCH1H060D	CHIP C	6.0PF D	
C61			CK73GB1H102K	CHIP C	1000PF K	
C62			CK73GB1E103K	CHIP C	0.010UF K	
C63			CK73GB1H471K	CHIP C	470PF K	
C65,66			CK73GB1H102K	CHIP C	1000PF K	
C67			CK73GB1E103K	CHIP C	0.010UF K	
C69			CK73GB1H471K	CHIP C	470PF K	
C70			CK73GB1C104K	CHIP C	0.10UF K	
C71			CC73GCH1H030C	CHIP C	3.0PF C	
C73			CK73GB1C104K	CHIP C	0.10UF K	
C75			CK73GB1H102K	CHIP C	1000PF K	
C76			CC73GCH1H030C	CHIP C	3.0PF C	
C77-79			CK73GB1H471K	CHIP C	470PF K	
C80			CC73GCH1H040C	CHIP C	4.0PF C	
C81,82			CK73GB1H471K	CHIP C	470PF C	
C83			CC73GCH1H070D	CHIP C	7.0PF D	E,E3
C83			CC73GCH1H070D	CHIP C	7.0PF D	M2,M3
C83			CC73GCH1H080D	CHIP C	8.0PF D	K
C84			CK73GB1H221K	CHIP C	220PF K	
C85			CK73GB1E103K	CHIP C	0.010UF K	
C86			CC73GCH1H050C	CHIP C	5.0PF C	
C87			CC73GCH1H0R5C	CHIP C	0.5PF C	
C88			CK73GB1H471K	CHIP C	470PF K	
C89			CC73GCH1H101J	CHIP C	100PF J	
C90			CC73GCH1H050C	CHIP C	5.0PF C	
C91			CK73GB1H102K	CHIP C	1000PF K	
C93			CC73GCH1H180J	CHIP C	18PF J	
C95			CK73GB1H471K	CHIP C	470PF K	
C96			CC73GCH1H180J	CHIP C	18PF J	
C97			CC73GCH1H050C	CHIP C	5.0PF C	
C99			CC73GCH1H150J	CHIP C	15PF J	
C100			CC73GCH1H1R5C	CHIP C	1.5PF C	
C101,102			CC73GCH1H060D	CHIP C	6.0PF D	
C103,104			CK73GB1H471K	CHIP C	470PF K	
C105			CK73GB1E103K	CHIP C	0.010UF K	
C106			CC73GCH1H050C	CHIP C	5.0PF C	
C107			CC73GCH1H080D	CHIP C	8.0PF D	
C108			CC73GCH1H470J	CHIP C	47PF J	
C109			CC73GCH1H060D	CHIP C	6.0PF D	
C110			CC73GCH1H120J	CHIP C	12PF J	
C111			CC73GCH1H060D	CHIP C	6.0PF D	
C112			CK73GB1H102K	CHIP C	1000PF K	
C113			CC73GCH1H010C	CHIP C	1.0PF C	
C114			CK73GB1C473K	CHIP C	0.047UF K	
C115			C92-0002-05	CHIP-TAN	0.22UF 35WV	
C116			CC73GCH1H1R5C	CHIP C	1.5PF C	
C117			CC73GCH1H040C	CHIP C	4.0PF C	
C118			CK73GB1H102K	CHIP C	1000PF K	
C119			CC73GCH1H060D	CHIP C	6.0PF D	
C120			CC73GCH1H180J	CHIP C	18PF J	
C121			CC73GCH1H470J	CHIP C	47PF J	
C122			CK73GB1H102K	CHIP C	1000PF K	
C124		*	C92-0695-05	ELECTRO	10UF 10WV	
C125			CC73GCH1H030C	CHIP C	3.0PF C	
C126,127			CK73GB1H102K	CHIP C	1000PF K	
C129			CK73GB1H471K	CHIP C	470PF K	
C130			CK73GB1C473K	CHIP C	0.047UF K	
C131			CK73GB1H471K	CHIP C	470PF K	
C132			CC73GCH1H150J	CHIP C	15PF J	
C133			CK73GB1H102K	CHIP C	1000PF K	
C134			CC73GCH1H820J	CHIP C	82PF J	
C135			CK73GB1H102K	CHIP C	1000PF K	
C136			C92-0002-05	CHIP-TAN	0.22UF 35WV	
C137			C92-0511-05	CHIP-TAN	0.15UF 35WV	
C138,139			CK73GB1H102K	CHIP C	1000PF K	
C140			C92-0606-05	CHIP-TAN	4.7UF 10WV	
C141			CC73GCH1H030C	CHIP C	3.0PF C	
C142		*	C92-0695-05	ELECTRO	10UF 10WV	

PARTS LIST

TX-RX UNIT (X57-52XX-XX)

Ref. No.	Adrress	New parts	Parts No.	Description			Destination
C143			CC73GCH1H080D	CHIP C	8.0PF	D	
C144			CC73GCH1H101J	CHIP C	100PF	J	
C145			CK73GB1E103K	CHIP C	0.010UF	K	
C146			CC73GCH1H101J	CHIP C	100PF	J	
C147			CK73GB1H471K	CHIP C	470PF	K	
C148			CC73GCH1H030C	CHIP C	3.0PF	C	
C149			CK73GB1H471K	CHIP C	470PF	K	
C151			C92-0001-05	CHIP-TAN	0.10UF	35WV	
C152			CK73GB1H102K	CHIP C	1000PF	K	
C153			CK73GB1E103K	CHIP C	0.010UF	K	
C154			C92-0606-05	CHIP-TAN	4.7UF	10WV	
C155			CK73GB1H102K	CHIP C	1000PF	K	
C156			CK73GB1H471K	CHIP C	470PF	K	
C157			CK73GB1H102K	CHIP C	1000PF	K	
C158			CC73GCH1H101J	CHIP C	100PF	J	
C159			CK73GB1E103K	CHIP C	0.010UF	K	
C160			CC73GCH1H101J	CHIP C	100PF	J	
C161			CC73GCH1H040C	CHIP C	4.0PF	C	
C162			CK73GB1H102K	CHIP C	1000PF	K	
C163			CC73GCH1H030C	CHIP C	3.0PF	C	E,E3
C164			CC73GCH1H050C	CHIP C	5.0PF	C	
C165			C92-0593-05	CHIP-ELE	33UF	10WV	
C166			CK73GB1H102K	CHIP C	1000PF	K	
C167			CC73GCH1H040C	CHIP C	4.0PF	C	
C168			CK73GB1H471K	CHIP C	470PF	K	
C169			CK73GB1E103K	CHIP C	0.010UF	K	
C170			CC73GCH1H050C	CHIP C	5.0PF	C	
C171			CK73GB1H102K	CHIP C	1000PF	K	
C172			CK73GB1H471K	CHIP C	470PF	K	
C173			CC73GCH1H150J	CHIP C	15PF	J	
C174			CK73GB1E103K	CHIP C	0.010UF	K	
C175			CK73GB1H471K	CHIP C	470PF	K	
C176			CK73GB1H102K	CHIP C	1000PF	K	
C177			CK73GB1E103K	CHIP C	0.010UF	K	
C178			CC73GCH1H050C	CHIP C	5.0PF	C	
C179			C92-0593-05	CHIP-ELE	33UF	10WV	
C180			CC73GCH1H1R5C	CHIP C	1.5PF	C	
C181			CK73GB1H471K	CHIP C	470PF	K	
C182			CC73GCH1H150J	CHIP C	15PF	J	
C183			CK73GB1H102K	CHIP C	1000PF	K	
C184			CC73GCH1H040C	CHIP C	4.0PF	C	
C185			CK73GB1H471K	CHIP C	470PF	K	
C186-188			CK73GB1H102K	CHIP C	1000PF	K	
C189			CC73GCH1H1R5C	CHIP C	1.5PF	C	E,E3
C189			CC73GCH1H1R5C	CHIP C	1.5PF	C	M2,M3
C190			CC73GCH1H040C	CHIP C	4.0PF	C	
C191			CK73GB1H102K	CHIP C	1000PF	K	
C192			CC73GCH1H080D	CHIP C	8.0PF	D	
C193			CK73GB1E103K	CHIP C	0.010UF	K	
C194			CK73GB1H471K	CHIP C	470PF	K	
C195			CC73GCH1H020C	CHIP C	2.0PF	C	E,E3
C195			CC73GCH1H020C	CHIP C	2.0PF	C	M2,M3
C196			CC73GCH1H010C	CHIP C	1.0PF	C	
C197			CC73GCH1H010C	CHIP C	1.0PF	C	E,E3
C197			CC73GCH1H010C	CHIP C	1.0PF	C	M2,M3
C198			CK73GB1H102K	CHIP C	1000PF	K	
C199			CC73GCH1H010C	CHIP C	1.0PF	C	
C200			CC73GCH1H040C	CHIP C	4.0PF	C	
C201			CC73GCH1H080D	CHIP C	8.0PF	D	K
C201			CC73GCH1H150J	CHIP C	15PF	J	E,E3
C202			CK73GB1C104K	CHIP C	0.10UF	K	
C203			CC73GCH1H010C	CHIP C	1.0PF	C	
C204			CK73GB1H471K	CHIP C	470PF	K	
C205			CK73GB1H471K	CHIP C	470PF	K	E,E3
C205			CK73GB1H471K	CHIP C	470PF	K	M2,M3
C206			CK73GB1E103K	CHIP C	0.010UF	K	
C207			CK73GB1H471K	CHIP C	470PF	K	
C208			CK73GB1E103K	CHIP C	0.010UF	K	
C209			CK73GB1C104K	CHIP C	0.10UF	K	
C210			CC73GCH1H390J	CHIP C	39PF	J	
C211			CC73GCH1H101J	CHIP C	100PF	J	
C212			CK73GB1H471K	CHIP C	470PF	K	
C213			CK73GB1H102K	CHIP C	1000PF	K	
C214			CC73GCH1H030C	CHIP C	3.0PF	C	E,E3
C214			CC73GCH1H030C	CHIP C	3.0PF	C	M2,M3
C215			CC73GCH1H030C	CHIP C	3.0PF	C	
C216			CC73GCH1H680J	CHIP C	68PF	J	
C217			CC73GCH1H180J	CHIP C	18PF	J	
C218			CC73GCH1H020C	CHIP C	2.0PF	C	E,E3
C218			CC73GCH1H020C	CHIP C	2.0PF	C	M2,M3
C219-221			CK73GB1C104K	CHIP C	0.10UF	K	
C222			CK73GB1E103K	CHIP C	0.010UF	K	
C223			CC73GCH1H101J	CHIP C	100PF	J	
C224			CC73GCH1H560J	CHIP C	56PF	J	
C226			CK73GB1H102K	CHIP C	1000PF	K	
C227			CC73GCH1H050C	CHIP C	5.0PF	C	
C228			CK73GB1H471K	CHIP C	470PF	K	E,E3
C228			CK73GB1H471K	CHIP C	470PF	K	M2,M3
C229			CK73GB1H102K	CHIP C	1000PF	K	
C230			CK73GB1H471K	CHIP C	470PF	K	
C231			CK73GB1C333K	CHIP C	0.033UF	K	
C232			C92-0004-05	CHIP-TAN	1.0UF	16WV	
C233			CC73GCH1H050C	CHIP C	5.0PF	C	
C234,235			CK73GB1H102K	CHIP C	1000PF	K	
C236			CK73GB1C473K	CHIP C	0.047UF	K	
C237			CK73GB1E103K	CHIP C	0.010UF	K	
C238			CK73GB1E102K	CHIP C	1000PF	K	
C239			CC73GCH1H101J	CHIP C	100PF	J	
C240			CK73GB1H471K	CHIP C	470PF	K	
C241			CC73GCH1H101J	CHIP C	100PF	J	
C242			CK73GB1H102K	CHIP C	1000PF	K	
C243			CK73GB1H471K	CHIP C	470PF	K	
C244			CK73GB1H102K	CHIP C	1000PF	K	
C245			CK73GB1E103K	CHIP C	0.010UF	K	
C246			CK73GB1H102K	CHIP C	1000PF	K	
C248			CK73GB1H102K	CHIP C	1000PF	K	
C249			CK73GB1C104K	CHIP C	0.10UF	K	
C250			CK73GB1H102K	CHIP C	1000PF	K	
C251			CK73GB1C473K	CHIP C	0.047UF	K	
C252			CK73GB1H471K	CHIP C	470PF	K	

PARTS LIST

TX-RX UNIT (X57-52XX-XX)

Ref. No.	Address	New parts	Parts No.	Description			Destination
C253			CC73GCH1H390J	CHIP C	39PF	J	
C255			CC73GCH1H080D	CHIP C	8.0PF	D	
C256			CK73GB1E103K	CHIP C	0.010UF	K	
C257			CK73GB1H471K	CHIP C	470PF	K	
C258			CK73GB1E103K	CHIP C	0.010UF	K	
C259			CC73GCH1H220J	CHIP C	22PF	J	
C260			C92-0610-05	ELECTRO	47UF	16WV	
C262			CK73GB1H272K	CHIP C	2700PF	K	
C263			CK73GB1E103K	CHIP C	0.010UF	K	
C264			CK73GB1H471K	CHIP C	470PF	K	
C265			CC73GCH1H220J	CHIP C	22PF	J	
C267			CK73GB1H102K	CHIP C	1000PF	K	
C269			CK73GB1C104K	CHIP C	0.10UF	K	
C270			CK73GB1H102K	CHIP C	1000PF	K	
C271			CK73GB1C104K	CHIP C	0.10UF	K	
C272			CC73GCH1H120J	CHIP C	12PF	J	
C273			C92-0001-05	CHIP-C	0.1UF	35WV	
C274			CK73GB1H471K	CHIP C	470PF	K	
C275			CK73GB1H102K	CHIP C	1000PF	K	
C276			CK73FF1C105Z	CHIP C	1.0UF	Z	
C277			CK73GB1H102K	CHIP C	1000PF	K	
C278			CC73GCH1H050C	CHIP C	5.0PF	C	
C279			C92-0004-05	CHIP-TAN	1.0UF	16WV	
C280			CK73GB1H471K	CHIP C	470PF	K	E,E3
C280			CK73GB1H471K	CHIP C	470PF	K	M2,M3
C281			CC73GCH1H330J	CHIP C	33PF	J	
C282,283			CC73GCH1H820J	CHIP C	82PF	J	
C284			CC73GCH1H101J	CHIP C	100PF	J	
C285			CC73GCH1H560J	CHIP C	56PF	J	
C288			CC73GCH1H101J	CHIP C	100PF	J	
C289			C92-0523-05	CHIP-ELE	10UF	16WV	
C292			CK73GB1H102K	CHIP C	1000PF	K	
C294			CK73GB1H102K	CHIP C	1000PF	K	
C298			CK73GB1E103K	CHIP C	0.010UF	K	
C300			CK73GB1E103K	CHIP C	0.010UF	K	
C302,303			CK73GB1H102K	CHIP C	1000PF	K	
C304			CK73GB1E103K	CHIP C	0.010UF	K	
C305			CK73GB1H102K	CHIP C	1000PF	K	
C307			CK73GB1H102K	CHIP C	1000PF	K	
C308			CC73GCH1H101J	CHIP C	100PF	J	
C309			C92-0523-05	CHIP-ELE	10UF	16WV	
C310			CK73GB1H102K	CHIP C	1000PF	K	
C311			CC73GCH1H101J	CHIP C	100PF	J	
C312			CC73GCH1H0R5C	CHIP C	0.5PF	C	
C313			CK73GB1C104K	CHIP C	0.10UF	K	
C314,315			CK73GB1H102K	CHIP C	1000PF	K	
C316			C92-0554-05	CHIP-TAN	33UF	16WV	
C317			CK73GB1H821K	CHIP C	820PF	K	
C318			CK73GB1H102K	CHIP C	1000PF	K	
C319,320			CK73GB1E103K	CHIP C	0.010UF	K	
C321			CK73GB1C104K	CHIP C	0.10UF	K	
C322			C93-0555-05	CHIP C	5.0PF	C	
C324			C92-0001-05	CHIP-C	0.1UF	35WV	
C325			C93-0560-05	CHIP C	10PF	D	
C326,327			CK73GB1H102K	CHIP C	1000PF	K	

Ref. No.	Address	New parts	Parts No.	Description			Destination
C328			C93-0558-05	CHIP C	8.0PF	D	
C330			CK73GB1H102K	CHIP C	1000PF	K	
C331			C92-0004-05	CHIP-TAN	1.0UF	16WV	
C332			CC73GCH1H390J	CHIP C	39PF	J	
C334			C93-0572-05	CHIP C	100PF	J	
C336			CC73GCH1H0R5C	CHIP C	0.5PF	C	
C337			CC73GCH1H020C	CHIP C	2.0PF	C	
C338			C93-0564-05	CHIP C	22PF	J	
C339			CK73GB1E103K	CHIP C	0.010UF	K	
C342			CK73GB1C104K	CHIP C	0.10UF	K	
C344			CC73GCH1H010C	CHIP C	1.0PF	C	
C345			CC73GCH1H020C	CHIP C	2.0PF	C	
C346			C93-0557-05	CHIP C	7.0PF	D	
C347			CK73GB1C104K	CHIP C	0.10UF	K	
C348			CC73GCH1H0R5C	CHIP C	0.5PF	C	
C349			CC73GCH1H010C	CHIP C	1.0PF	C	
C350			CC73GCH1H0R5C	CHIP C	0.5PF	C	E,E3
C350			CC73GCH1H0R5C	CHIP C	0.5PF	C	M2,M3
C351			CK73GB1E103K	CHIP C	0.010UF	K	
C352			C92-0558-05	CHIP-ELE	100UF	16WV	
C353			CC73FCH1H0R5C	CHIP C	0.5PF	C	E,E3
C353			CC73FCH1H0R5C	CHIP C	0.5PF	C	M2,M3
C354			CK73GB1H102K	CHIP C	1000PF	K	
C355			CC73GCH1H101J	CHIP C	100PF	J	
C356			CK73GB1E103K	CHIP C	0.010UF	K	
C357			C93-0555-05	CHIP C	5.0PF	C	
C358		*	C93-0564-05	CHIP C	22PF	J	
C359			CK73GB1C104K	CHIP C	0.10UF	K	
C360			C93-0555-05	CHIP C	5.0PF	C	
C362			CK73GB1H102K	CHIP C	1000PF	K	
C363			C93-0567-05	CHIP C	39PF	J	
C364,365			CK73GB1E103K	CHIP C	0.010UF	K	
C366			C93-0555-05	CHIP C	5.0PF	C	
C367			CC73GCH1H0R5C	CHIP C	0.5PF	C	
C368			CC73GCH1H010C	CHIP C	1.0PF	C	
C369			C93-0564-05	CHIP C	22PF	J	
C370			CK73GB1H102K	CHIP C	1000PF	K	
C371		*	C90-4053-05	ELECTRO	1000UF	16WV	
C372			CK73GB1H102K	CHIP C	1000PF	K	
C376,377			CK73GB1H102K	CHIP C	1000PF	K	
C382,383			CK73GB1H471K	CHIP C	470PF	K	
C385			CK73GB1H471K	CHIP C	470PF	K	
C386,387			CC73GCH1H030C	CHIP C	3.0PF	C	
C388,389			CK73GB1H471K	CHIP C	470PF	K	E,E3
C388,389			CK73GB1H471K	CHIP C	470PF	K	M2,M3
C390			C92-0610-05	ELECTRO	47UF	16WV	
C391			CK73GB1E103K	CHIP C	0.010UF	K	
C392,393			CK73GB1H102K	CHIP C	1000PF	K	
C394,395			CK73GB1E123K	CHIP C	0.012UF	K	
C396			CK73GB1C104K	CHIP C	0.10UF	K	
C397			CK73GB1C393K	CHIP C	0.039UF	K	
C398,399			CK73GB1E123K	CHIP C	0.012UF	K	
C400			CK73GB1C393K	CHIP C	0.039UF	K	
C401			CK73GB1C104K	CHIP C	0.10UF	K	
C402			CK73GB1E103K	CHIP C	0.010UF	K	

PARTS LIST

TX-RX UNIT (X57-52XX-XX)

Ref. No.	Adress	New parts	Parts No.	Description			Destination
C403			C92-0558-05	CHIP-ELE	100UF	16WV	
C404			CC73GCH1H020C	CHIP C	2.0PF	C	E,E3
C404			CC73GCH1H020C	CHIP C	2.0PF	C	M2,M3
C405,406			CK73GB1H471K	CHIP C	470PF	K	
C407			CK73GB1E103K	CHIP C	0.010UF	K	
C408			CK73GB1H471K	CHIP C	470PF	K	
C409			CK73GB1H102K	CHIP C	1000PF	K	
C410			CK73GB1E103K	CHIP C	0.010UF	K	
C411			CC73GCH1H101J	CHIP C	100PF	J	E,E3
C411			CC73GCH1H101J	CHIP C	100PF	J	M2,M3
C412			CK73GB1H471K	CHIP C	470PF	K	E,E3
C412			CK73GB1H471K	CHIP C	470PF	K	M2,M3
C413			CK73GB1H102K	CHIP C	1000PF	K	
C415			CK73GB1E103K	CHIP C	0.010UF	K	
C416			CK73GB1H471K	CHIP C	470PF	K	E,E3
C416			CK73GB1H471K	CHIP C	470PF	K	M2,M3
C418			CC73GCH1H020C	CHIP C	2.0PF	C	E,E3
C418			CC73GCH1H020C	CHIP C	2.0PF	C	M2,M3
C421,422			CC73GCH1H470J	CHIP C	47PF	J	
C423,424			CK73GB1H102K	CHIP C	1000PF	K	
C425			CC73GCH1H040C	CHIP C	4.0PF	C K	
C426			CK73GB1C104K	CHIP C	0.10UF	K	
C427			C92-0610-05	ELECTRO	47UF	16WV	
C428			CC73GCH1H101J	CHIP C	100PF	J	
C429		*	C90-4053-05	ELECTRO	1000UF	16WV	
C430			C90-0566-05	ELECTRO	2200UF	25WV	
C501,502			CK73GB1H102K	CHIP C	1000PF	K	
C503			CE04CW0J331M	ELECTRO	330UF	6.3WV	
C504			CC73GCH1H101J	CHIP C	100PF	J	
C505,506			CK73FB1A105K	CHIP C	1.0UF	K	
C507			C92-0606-05	CHIP-TAN	4.7UF	10WV	
C508			CC73GCH1H101J	CHIP C	100PF	J	
C511			CK73GB1H103K	CHIP C	0.010UF	K	
C512			CK73GB1H272K	CHIP C	2700PF	K	
C513			CK73GB1E103K	CHIP C	0.010UF	K	
C514			C92-0558-05	CHIP-ELE	100UF	16WV	
C515			CK73GB1H471K	CHIP C	470PF	K	
C517			CK73GB1C104K	CHIP C	0.10UF	K	
C518,519			CK73FB1A105K	CHIP C	1.0UF	K	
C520			C92-0606-05	CHIP-TAN	4.7UF	10UF	
C521			CK73GB1C104K	CHIP C	0.10UF	K	
C522			CK73GB1E103K	CHIP C	0.010UF	K	
C523			C92-0558-05	CHIP-ELE	100UF	16WV	
C524			CK73GB1H562K	CHIP C	5600PF	K	
C525			CK73GB1H222K	CHIP C	2200PF	K	
C526			C92-0606-05	CHIP-TAN	4.7UF	10WV	
C527-529			CK73GB1E103K	CHIP C	0.010UF	K	
C530			CK73GB1H152K	CHIP C	1500PF	K	
C531			CK73GB1E223K	CHIP C	0.022UF	K	
C532			CC73GCH1H220J	CHIP C	22PF	J	
C533			CC73GCH1H101J	CHIP C	100PF	J	
C534			CC73GCH1H820J	CHIP C	82PF	J	
C535			CC73GCH1H330J	CHIP C	33PF	J	
C536			CK73GB1E103K	CHIP C	0.010UF	K	
C537			CC73GCH1H100D	CHIP C	10PF	D	

Ref. No.	Adress	New parts	Parts No.	Description			Destination
C538			C92-0004-05	CHIP-TAN	1.0UF	16WV	
C539			CK73GB1H681K	CHIP C	680PF	K	
C540			CK73GB1H102K	CHIP C	1000PF	K	
C541			CC73GCH1H100D	CHIP C	10PF	D	
C542			C92-0004-05	CHIP-TAN	1.0UF	16WV	
C543			CK73GB1C104K	CHIP C	0.10UF	K	
C544			CK73GB1E223K	CHIP C	0.022UF	K	
C545			CK73GB1H222K	CHIP C	2200PF	K	
C546			CK73GB1C104K	CHIP C	0.10UF	K	
C547			CK73FB1A105K	CHIP C	1.0UF	K	
C548			CK73GB1H102K	CHIP C	1000PF	K	
C549,550			CK73GB1E103K	CHIP C	0.010UF	K	
C551			CK73GB1C104K	CHIP C	0.10UF	K	
C552			CC73GCH1H101J	CHIP C	100PF	J	
C553			CK73GB1H471K	CHIP C	470PF	K	
C554			C92-0606-05	CHIP-TAN	4.7UF	10WV	
C555			CC73GCH1H101J	CHIP C	100PF	J	
C556			CK73GB1H471K	CHIP C	470PF	K	
C557			CK73GB1H102K	CHIP C	1000PF	K	
C558			CC73GCH1H101J	CHIP C	100PF	J	
C559			CK73GB1H102K	CHIP C	1000PF	K	
C560			CK73GB1C104K	CHIP C	0.10UF	K	
C561,562			CC73GCH1H101J	CHIP C	100PF	J	
C563,564			CK73GB1H103K	CHIP C	0.010UF	K	
C565-567			CK73FB1A105K	CHIP C	1.0UF	K	
C568,569			CC73GCH1H101J	CHIP C	100PF	J	
C570,571			CK73FB1A105K	CHIP C	1.0UF	K	
C572,573			CC73GCH1H101J	CHIP C	100PF	J	
C574,575			CK73GB1C104K	CHIP C	0.10UF	K	
C576			CK73GB1E223K	CHIP C	0.022UF	K	
C578			CK73GB1C104K	CHIP C	0.10UF	K	
C579			C92-0005-05	CHIP-TAN	2.2UF	6.3WV	
C582			CK73GB1H152K	CHIP C	1500PF	K	
C583			CK73GB1C333K	CHIP C	0.033UF	K	
C584,585			CK73GB1H102K	CHIP C	1000PF	K	E,E3
C701-706			CK73GB1H103K	CHIP C	0.010UF	K	
TC1			C05-0384-05	TRIMMER CAPACITOR	10PF		
CN1,2			E40-5744-05	PIN CONNECTOR FOR INSIDE(20P)			
CN3,4			E40-3237-05	PIN CONNECTOR FOR INSIDE(2P)			
CN5			E23-0486-05	TERMINAL			
CN501			E40-5652-45	PIN CONNECTOR FOR INSIDE(4P)			
CN502,503			E40-5744-05	PIN CONNECTOR FOR INSIDE(20P)			
CN504			E40-5618-05	PIN CONNECTOR FOR INSIDE(8P)			
CN701		*	E40-5396-05	PIN CONNECTOR FOR INSIDE(9P)			
J1,2			E11-0425-05	PHONE JACK			
J501			E56-0404-05	DATA CONNECTOR (6P)			
J502			E08-0877-05	MIC CONNECTOR			
W501,502			E37-0458-05	LEAD WIRE			
F1,2			F53-0108-05	FUSE	(1.8A)		
F3			F53-0128-05	FUSE	(0.5A)		
F501			F53-0108-05	FUSE	(1.8A)		
CD1			L79-1113-05	TUNING COIL (450K)			
CD2			L79-1013-05	TUNING COIL (455K)			

TM-V7A/E

TX-RX UNIT (X57-52XX-XX)

Ref. No.	Adress	New parts	Parts No.	Description	Destination
CF1		*	L72-0931-05	CERAMIC FILTER	
CF2			L72-0366-05	CERAMIC FILTER	
L1			L40-8271-34	SMALL FIXED INDUCTOR (82NH)	
L2			L40-1881-37	SMALL FIXED INDUCTOR (0.18UH)	
L3			L40-2781-37	SMALL FIXED INDUCTOR (0.27UH)	
L4			L40-4771-36	SMALL FIXED INDUCTOR (47NH)	
L6			L34-4343-05	COIL	
L7			L40-3971-36	SMALL FIXED INDUCTOR (39NH)	
L9			L40-2281-37	SMALL FIXED INDUCTOR (0.22UH)	
L12			L34-4344-05	COIL	
L13			L40-4771-36	SMALL FIXED INDUCTOR (47NH)	
L14			L40-1001-37	SMALL FIXED INDUCTOR (10UH)	
L17			L34-4344-05	COIL	
L18			L40-2771-36	SMALL FIXED INDUCTOR (27NH)	
L19			L40-6871-34	SMALL FIXED INDUCTOR (68NH)	
L20			L40-3371-36	SMALL FIXED INDUCTOR (33NH)	
L21		*	L40-1075-44	SMALL FIXED INDUCTOR (10NH)	
L22			L40-1581-37	SMALL FIXED INDUCTOR (0.15UH)	
L23			L40-4771-36	SMALL FIXED INDUCTOR (47NH)	
L24			L40-6871-34	SMALL FIXED INDUCTOR (68NH)	
L25			L40-2771-36	SMALL FIXED INDUCTOR (27NH)	
L26 ,27			L40-1871-36	SMALL FIXED INDUCTOR (18NH)	
L28		*	L79-1432-05	FILTER (435MHZ)	E,E3
L28		*	L79-1432-05	FILTER (435MHZ)	M2,M3
L28		*	L79-1433-05	FILTER (444MHZ)	K
L29		*	L40-1075-44	SMALL FIXED INDUCTOR (10NH)	
L30			L40-4771-36	SMALL FIXED INDUCTOR (47NH)	
L31			L40-1081-37	SMALL FIXED INDUCTOR (0.1UH)	
L32			L40-3971-36	SMALL FIXED INDUCTOR (39NH)	
L33			L40-2271-36	SMALL FIXED INDUCTOR (22NH)	
L34			L40-1271-36	SMALL FIXED INDUCTOR (12NH)	
L35			L40-2281-37	SMALL FIXED INDUCTOR (0.22UH)	
L36			L40-4771-36	SMALL FIXED INDUCTOR (47NH)	
L37			L40-3971-36	SMALL FIXED INDUCTOR (39NH)	
L38			L40-5671-36	SMALL FIXED INDUCTOR (56NH)	
L39			L40-1091-37	SMALL FIXED INDUCTOR (1.0UH)	
L40		*	L79-1432-05	FILTER (435MHZ)	E,E3
L40		*	L79-1432-05	FILTER (435MHZ)	M2,M3
L40		*	L79-1433-05	FILTER (444MHZ)	K
L41			L40-3971-36	SMALL FIXED INDUCTOR (39NH)	E,E3
L41			L40-3971-36	SMALL FIXED INDUCTOR (39NH)	M2,M3
L42			L40-2271-36	SMALL FIXED INDUCTOR (22NH)	
L43			L40-2281-37	SMALL FIXED INDUCTOR (0.22UH)	
L44			L40-2271-36	SMALL FIXED INDUCTOR (22NH)	
L45			L40-5681-37	SMALL FIXED INDUCTOR (0.56UH)	
L46			L40-6861-36	SMALL FIXED INDUCTOR (6.8NH)	E,E3
L46			L40-6861-36	SMALL FIXED INDUCTOR (6.8NH)	M2,M3
L47			L40-1871-36	SMALL FIXED INDUCTOR (18NH)	E,E3
L47			L40-1871-36	SMALL FIXED INDUCTOR (18NH)	M2,M3
L48			L40-1281-37	SMALL FIXED INDUCTOR (0.12UH)	
L49			L40-6861-36	SMALL FIXED INDUCTOR (6.8NH)	E,E3
L49			L40-6861-36	SMALL FIXED INDUCTOR (6.8NH)	M2,M3
L50			L40-1881-37	SMALL FIXED INDUCTOR (0.18UH)	
L52			L40-6861-36	SMALL FIXED INDUCTOR (6.8NHH)	E,E3
L52			L40-6861-36	SMALL FIXED INDUCTOR (6.8NHH)	M2,M3

Ref. No.	Adress	New parts	Parts No.	Description	Destination
L53			L40-2271-36	SMALL FIXED INDUCTOR (22NH)	
L54 ,55			L40-6861-36	SMALL FIXED INDUCTOR (6.8NH)	E,E3
L54 ,55			L40-6861-36	SMALL FIXED INDUCTOR (6.8NH)	M2,M3
L56 ,57			L40-1571-36	SMALL FIXED INDUCTOR (15NH)	
L58			L40-3371-36	SMALL FIXED INDUCTOR (33NH)	
L59			L40-1095-34	SMALL FIXED INDUCTOR (1.0UH)	
L60			L40-2771-36	SMALL FIXED INDUCTOR (22NH)	
L62			L40-4771-36	SMALL FIXED INDUCTOR (47NH)	
L63			L34-0742-05	COIL (5T)	
L64			L34-1239-05	COIL (0.5T)	
L65			L34-4404-05	COIL (3.5T)	
L66			L34-1239-05	COIL (0.5T)	
L67			L34-1185-05	COIL (2.5T)	
L68			L34-0895-05	COIL (6T)	
L70			L34-1185-05	COIL (2.5T)	
L71			L34-0499-05	COIL (4T)	
L72			L34-1239-05	COIL (0.5T)	
L73			L34-1058-05	COIL (2.5T)	E,E3
L73			L34-1058-05	COIL (2.5T)	M2,M3
L74			L34-1228-05	COIL (1T)	
L75			L34-1052-05	COIL (1.5T)	E,E3
L75			L34-1052-05	COIL (1.5T)	M2,M3
L76			L34-4402-05	COIL (2.5T)	
L77			L34-0499-05	COIL (4T)	
L78			L34-4402-05	COIL (2.5T)	
L79 ,80			L34-0499-05	COIL (4T)	
L81			L40-1581-37	SMALL FIXED INDUCTOR (0.15UH)	
L83			L40-2271-36	SMALL FIXED INDUCTOR (22NH)	
L84			L40-6861-36	SMALL FIXED INDUCTOR (6.8NH)	
L85			L40-1071-36	SMALL FIXED INDUCTOR (10NH)	E,E3
L85			L40-1071-36	SMALL FIXED INDUCTOR (10NH)	M2,M3
L87 ,88			L40-3971-34	SMALL FIXED INDUCTOR (39NH)	
L89			L40-2771-36	SMALL FIXED INDUCTOR (27NH)	K
L501			L40-1091-42	SMALL FIXED INDUCTOR (1.0UH)	
L502			L92-0131-05	CORE	
X1			L77-1573-05	CRYSTAL RESONATOR (12.8MHZ)	
X2		*	L77-1678-05	CRYSTAL RESONATOR (45.505MHZ)	
X501			L77-1476-05	CRYSTAL RESONATOR (4.19MHZ)	
XF1		*	L71-0481-05	CRYSTAL FILTER	
XF2		*	L71-0482-05	CRYSTAL FILTER	
CP501			R90-0724-05	MULTI-COMP 1K X4	
CP502			R90-0714-05	MULTI-COMP 10K X4	
R1			RK73GB1J471J	CHIP R 470 J 1/16W	
R2			R92-1252-05	CHIP R 0 OHM	
R3,4			RK73GB1J473J	CHIP R 47K J 1/16W	
R5			R92-1252-05	CHIP R 0 OHM	
R6,7			RK73GB1J4R7J	CHIP R 4.7 J 1/16W	
R8			RK73GB1J182J	CHIP R 1.8K J 1/16W	
R9			RK73GB1J392J	CHIP R 3.9K J 1/16W	
R10			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R11			R92-1252-05	CHIP R 0 OHM	
R12			RK73GB1J153J	CHIP R 15K J 1/16W	
R13			RK73GB1J474J	CHIP R 470K J 1/16W	
R14			RK73GB1J153J	CHIP R 15K J 1/16W	
R15			RK73GB1J473J	CHIP R 47K J 1/16W	

PARTS LIST

Ref. No.	Adress	New parts	Parts No.	Description				Destination
R16			RK73GB1J104J	CHIP R	100K	J	1/16W	
R17			RK73GB1J182J	CHIP R	1.8K	J	1/16W	
R18			RK73GB1J101J	CHIP R	100	J	1/16W	
R19			RK73GB1J683J	CHIP R	68K	J	1/16W	
R20			RK73GB1J223J	CHIP R	22K	J	1/16W	
R21			RK73GB1J333J	CHIP R	33K	J	1/16W	
R22			RK73GB1J274J	CHIP R	270K	J	1/16W	
R23			RK73GB1J182J	CHIP R	1.8K	J	1/16W	
R24			RK73GB1J101J	CHIP R	100	J	1/16W	
R25			RK73GB1J473J	CHIP R	47K	J	1/16W	
R28			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R29			RK73GB1J471J	CHIP R	470	J	1/16W	
R30			RK73GB1J103J	CHIP R	10K	J	1/16W	
R31			RK73GB1J221J	CHIP R	220	J	1/16W	
R32			RK73GB1J471J	CHIP R	470	J	1/16W	
R33			RK73GB1J104J	CHIP R	100K	J	1/16W	
R34			RK73GB1J101J	CHIP R	100	J	1/16W	
R35			RK73GB1J223J	CHIP R	22K	J	1/16W	
R36			RK73GB1J103J	CHIP R	10K	J	1/16W	
R38			RK73GB1J331J	CHIP R	330	J	1/16W	
R39			RK73GB1J223J	CHIP R	22K	J	1/16W	
R40			RK73GB1J184J	CHIP R	180K	J	1/16W	
R41			RK73GB1J473J	CHIP R	47K	J	1/16W	
R42			RK73GB1J823J	CHIP R	82K	J	1/16W	
R43			RK73GB1J223J	CHIP R	22K	J	1/16W	
R44			RK73GB1J103J	CHIP R	10K	J	1/16W	
R45			RK73GB1J104J	CHIP R	100K	J	1/16W	
R46			RK73GB1J220J	CHIP R	22	J	1/16WK	
R46			R92-1252-05	CHIP R	0 OHM			E,E3
R46			R92-1252-05	CHIP R	0 OHM			M2,M3
R47			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R48			RK73GB1J151J	CHIP R	150	J	1/16W	
R49			RK73GB1J473J	CHIP R	47K	J	1/16W	
R50			RK73GB1J103J	CHIP R	10K	J	1/16W	
R51			RK73GB1J331J	CHIP R	330	J	1/16W	
R52			RK73GB1J103J	CHIP R	10K	J	1/16W	
R53			RK73GB1J101J	CHIP R	100	J	1/16W	
R54			RK73GB1J103J	CHIP R	10K	J	1/16W	
R55			RK73GB1J223J	CHIP R	22K	J	1/16W	
R56			RK73FB2A821J	CHIP R	820	J	1/10W	
R57			RK73FB2A5R6J	CHIP R	5.6	J	1/10W	
R58			RK73FB2A821J	CHIP R	820	J	1/10W	
R59			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R60			RK73GB1J103J	CHIP R	10K	J	1/16W	
R61			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R62			RK73GB1J184J	CHIP R	180K	J	1/16W	
R63			RK73GB1J104J	CHIP R	100K	J	1/16W	
R64			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R65			RK73GB1J823J	CHIP R	82K	J	1/16W	
R66			RK73GB1J473J	CHIP R	47K	J	1/16W	
R67			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R68			RK73GB1J273J	CHIP R	27K	J	1/16W	
R69			RK73GB1J183J	CHIP R	18K	J	1/16W	
R70 ,71			RK73GB1J101J	CHIP R	100	J	1/16W	
R72			RK73GB1J102J	CHIP R	1.0K	J	1/16W	

Ref. No.	Adress	New parts	Parts No.	Description				Destination
R73			RK73GB1J104J	CHIP R	100K	J	1/16W	
R74			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R75			RK73GB1J103J	CHIP R	10K	J	1/16W	
R76			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R77			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R78			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R79			RK73GB1J473J	CHIP R	47K	J	1/16W	
R80			RK73GB1J101J	CHIP R	100	J	1/16W	
R81			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R82			RK73GB1J221J	CHIP R	220	J	1/16W	
R83			RK73GB1J273J	CHIP R	27K	J	1/16W	
R84			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R85			RK73GB1J223J	CHIP R	22K	J	1/16W	
R86			RK73GB1J272J	CHIP R	2.7K	J	1/16W	
R87			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R88			RK73GB1J183J	CHIP R	18K	J	1/16W	
R89			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R90			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R91			RK73GB1J103J	CHIP R	10K	J	1/16W	
R93			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R94			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R96			RK73GB1J470J	CHIP R	47	J	1/16W	
R98			RK73GB1J101J	CHIP R	100	J	1/16W	
R99			RK73GB1J681J	CHIP R	680	J	1/16W	
R102			RK73GB1J470J	CHIP R	47	J	1/16W	M2,M3
R102			RK73GB1J470J	CHIP R	47	J	1/16W	E,E3
R103			RK73GB1J220J	CHIP R	22	J	1/16W	
R104			RK73GB1J562J	CHIP R	5.6K	J	1/16W	
R105			RK73GB1J101J	CHIP R	100	J	1/16W	
R106			RK73GB1J103J	CHIP R	10K	J	1/16W	
R108			RK73GB1J122J	CHIP R	1.2K	J	1/16W	
R109			RK73GB1J470J	CHIP R	47	J	1/16W	
R110			RK73GB1J331J	CHIP R	330	J	1/16W	
R111			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R112			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R113			RK73GB1J101J	CHIP R	100	J	1/16W	
R114			RK73GB1J104J	CHIP R	100K	J	1/16W	
R115			RK73GB1J681J	CHIP R	680	J	1/16W	
R116			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R117			RK73GB1J184J	CHIP R	180K	J	1/16W	
R118			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R119			RK73GB1J101J	CHIP R	100	J	1/16W	
R120			RK73GB1J331J	CHIP R	330	J	1/16W	
R121			RK73GB1J103J	CHIP R	10K	J	1/16W	
R122			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R123			RK73GB1J471J	CHIP R	470	J	1/16W	
R124			RK73GB1J823J	CHIP R	82K	J	1/16W	
R125			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R126			RK73GB1J100J	CHIP R	10	J	1/16W	
R127			RK73GB1J104J	CHIP R	100K	J	1/16W	
R128			RK73GB1J103J	CHIP R	10K	J	1/16W	
R129			RK73GB1J473J	CHIP R	47K	J	1/16W	
R130			RK73GB1J103J	CHIP R	10K	J	1/16W	
R131			RK73GB1J471J	CHIP R	470	J	1/16W	
R133			RK73GB1J221J	CHIP R	220	J	1/16W	

TM-V7A/E

PARTS LIST

TX-RX UNIT (X57-52XX-XX)

Ref. No.	Adress	New parts	Parts No.	Description				Destination
R134			R92-1252-05	CHIP R	0			K,M2,M3
R134			RK73GB1J101J	CHIP R	100	J	1/16W	E,E3
R135			RK73GB1J221J	CHIP R	220	J	1/16W	
R136			RK73GB1J471J	CHIP R	470	J	1/16W	
R137			RK73GB1J101J	CHIP R	100	J	1/16W	
R138			RK73GB1J122J	CHIP R	1.2K	J	1/16W	
R139			RK73GB1J184J	CHIP R	180K	J	1/16W	
R140			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R141			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R142			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R143			RK73GB1J471J	CHIP R	470	J	1/16W	
R144			RK73GB1J272J	CHIP R	2.7K	J	1/16W	
R145			RK73GB1J471J	CHIP R	470	J	1/16W	
R146			RK73GB1J103J	CHIP R	10K	J	1/16W	
R147			RK73GB1J182J	CHIP R	1.8K	J	1/16W	
R148			RK73GB1J470J	CHIP R	47	J	1/16W	
R149			R92-1252-05	CHIP R	0 OHM			
R150			RK73GB1J471J	CHIP R	470	J	1/16W	
R151			RK73GB1J103J	CHIP R	10K	J	1/16W	
R152			RK73GB1J182J	CHIP R	1.8K	J	1/16W	
R153			RK73GB1J223J	CHIP R	22K	J	1/16W	
R154			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R155			RK73GB1J334J	CHIP R	330K	J	1/16W	
R156			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R157			RK73GB1J823J	CHIP R	82K	J	1/16W	E,E3
R157			RK73GB1J823J	CHIP R	82K	J	1/16W	M2,M3
R158			RK73GB1J470J	CHIP R	47	J	1/16W	
R159			RK73GB1J823J	CHIP R	82K	J	1/16W	E,E3
R159			RK73GB1J823J	CHIP R	82K	J	1/16W	M2,M3
R160			RK73GB1J222J	CHIP R	2.2K	J	1/16W	E,E3
R160			RK73GB1J222J	CHIP R	2.2K	J	1/16W	M2,M3
R161			RK73GB1J221J	CHIP R	220	J	1/16W	
R162			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R163			RK73GB1J471J	CHIP R	470	J	1/16W	E,E3
R163			RK73GB1J471J	CHIP R	470	J	1/16W	M2,M3
R164			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R165			RK73GB1J272J	CHIP R	2.7K	J	1/16W	
R166			RK73GB1J222J	CHIP R	2.2K	J	1/16W	E,E3
R166			RK73GB1J222J	CHIP R	2.2K	J	1/16W	M2,M3
R167			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R168			RK73GB1J331J	CHIP R	330	J	1/16W	
R169			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R170			RK73GB1J103J	CHIP R	10K	J	1/16W	
R171			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R172			RK73GB1J122J	CHIP R	1.2K	J	1/16W	
R173			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R174			RK73GB1J822J	CHIP R	8.2K	J	1/16W	
R175			RK73GB1J331J	CHIP R	330	J	1/16W	
R176			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R177			RK73GB1J221J	CHIP R	220	J	1/16W	E,E3
R177			RK73GB1J221J	CHIP R	220	J	1/16W	M2,M3
R178			RK73GB1J822J	CHIP R	8.2K	J	1/16W	
R179			RK73GB1J331J	CHIP R	330	J	1/16W	
R180			RK73GB1J101J	CHIP R	100	J	1/16W	
R181			RK73GB1J472J	CHIP R	4.7K	J	1/16W	

Ref. No.	Adress	New parts	Parts No.	Description				Destination
R182			RK73GB1J474J	CHIP R	470K	J	1/16W	
R183			RK73GB1J224J	CHIP R	220K	J	1/16W	
R184			RK73GB1J471J	CHIP R	470	J	1/16W	
R185			RK73GB1J221J	CHIP R	220	J	1/16W	
R186			RK73GB1J182J	CHIP R	1.8K	J	1/16W	
R187			RK73GB1J561J	CHIP R	560	J	1/16W	
R188			RK73GB1J470J	CHIP R	47	J	1/16W	
R189			RK73GB1J100J	CHIP R	10	J	1/16W	
R190			RK73GB1J104J	CHIP R	100K	J	1/16W	
R191			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R192			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R193			RK73GB1J331J	CHIP R	330	J	1/16W	
R194			RK73GB1J100J	CHIP R	10	J	1/16W	
R195			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R196			RK73GB1J560J	CHIP R	56	J	1/16W	
R197			RK73GB1J100J	CHIP R	10	J	1/16W	
R198			RK73GB1J334J	CHIP R	330K	J	1/16W	
R199			RK73GB1J470J	CHIP R	47	J	1/16W	E,E3
R199			R92-1252-05	CHIP R	0			K,M2,M3
R200			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R201			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R202			RK73GB1J681J	CHIP R	680	J	1/16W	
R204			RK73GB1J182J	CHIP R	1.8K	J	1/16W	
R205			RK73GB1J473J	CHIP R	47K	J	1/16W	
R206			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R207			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R208			RK73GB1J331J	CHIP R	330	J	1/16W	
R209			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R210			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R211			RK73GB1J470J	CHIP R	47	J	1/16W	
R212			RK73GB1J152J	CHIP R	1.5K	J	1/16W	
R213			RK73GB1J103J	CHIP R	10K	J	1/16W	
R218			RK73FB2A100J	CHIP R	10	J	1/10W	
R219			RK73GB1J103J	CHIP R	10K	J	1/16W	
R224			R92-0685-05	CHIP R	22	J	1/2W	
R225			R92-0670-05	CHIP R	0 OHM			
R226			R92-1252-05	CHIP R	0 OHM			
R229			RK73GB1J474J	CHIP R	470K	J	1/16W	
R230			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R231			RK73FB2A5R6J	CHIP R	5.6	J	1/10W	
R232			RK73FB2A821J	CHIP R	820	J	1/10W	
R233			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R234			RK73FB2A821J	CHIP R	820	J	1/10W	
R235			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R236			RK73GB1J331J	CHIP R	330	J	1/16W	
R237			RK73GB1J683J	CHIP R	68K	J	1/16W	
R238			R92-1213-05	CHIP R	100	J	1/2W	
R239			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R240			R92-1213-05	CHIP R	100	J	1/2W	
R241			RK73GB1J334J	CHIP R	330K	J	1/16W	
R243			RK73GB1J103J	CHIP R	10K	J	1/16W	
R244			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R245			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R248			RK73GB1J103J	CHIP R	10K	J	1/16W	
R251			RK73GB1J222J	CHIP R	2.2K	J	1/16W	

PARTS LIST

Ref. No.	Adress	New parts	Parts No.	Description				Destination	Ref. No.	Adress	New parts	Parts No.	Description				Destination
R255			RK73GB1J103J	CHIP R	10K	J	1/16W		R326,327			R92-1252-05	CHIP R	0 OHM			
R256			RK73GB1J152J	CHIP R	1.5K	J	1/16W		R328,329			RK73GB1J104J	CHIP R	100K	J	1/16W	
R257			RK73GB1J153J	CHIP R	15K	J	1/16W		R330			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R258			RK73GB1J222J	CHIP R	2.2K	J	1/16W		R331			RK73GB1J121J	CHIP R	120	J	1/16W	
R259			RK73GB1J683J	CHIP R	68K	J	1/16W		R332			RK73GB1J332J	CHIP R	3.3K	J	1/16W	
R260			RK73GB1J222J	CHIP R	2.2K	J	1/16W		R334,335			R92-1252-05	CHIP R	0 OHM			
R261-263			RK73GB1J103J	CHIP R	10K	J	1/16W		R501			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R264			RK73GB1J223J	CHIP R	22K	J	1/16W		R502			RK73GB1J473J	CHIP R	47K	J	1/16W	
R265			RK73GB1J473J	CHIP R	47K	J	1/16W		R503,504			RK73GB1J104J	CHIP R	100K	J	1/16W	
R266			RK73GB1J223J	CHIP R	22K	J	1/16W		R505			R92-1252-05	CHIP R	0 OHM			
R270			RK73GB1J182J	CHIP R	1.8K	J	1/16W		R506			RK73GB1J274J	CHIP R	270K	J	1/16W	
R271			RK73GB1J103J	CHIP R	10K	J	1/16W		R507			RK73GB1J103J	CHIP R	10K	J	1/16W	
R272			R92-1276-05	CHIP R	820	J	1/4W		R508			RK73GB1J101J	CHIP R	100	J	1/16W	
R273,274			RK73GB1J103J	CHIP R	10K	J	1/16W		R509			RK73GB1J224J	CHIP R	220K	J	1/16W	
R275			RK73GB1J220J	CHIP R	22	J	1/16W		R510			RK73GB1J394J	CHIP R	390K	J	1/16W	
R277			RK73GB1J333J	CHIP R	33K	J	1/16W		R511			RK73GB1J473J	CHIP R	47K	J	1/16W	
R278			RK73GB1J104J	CHIP R	100K	J	1/16W		R512			RK73GB1J184J	CHIP R	180K	J	1/16W	
R279,280			RK73GB1J103J	CHIP R	10K	J	1/16W		R513			RK73GB1J104J	CHIP R	100K	J	1/16W	
R281			RK73GB1J220J	CHIP R	22	J	1/16W		R514			RK73GB1J103J	CHIP R	10K	J	1/16W	
R282			RK73GB1J101J	CHIP R	100	J	1/16W		R515			RK73GB1J473J	CHIP R	47K	J	1/16W	
R283			RK73GB1J222J	CHIP R	2.2K	J	1/16W		R516			RK73GB1J104J	CHIP R	100K	J	1/16W	
R284			RK73GB1J222J	CHIP R	2.2K	J	1/16W	E,E3	R517			RK73GB1J124J	CHIP R	120K	J	1/16W	
R284			RK73GB1J222J	CHIP R	2.2K	J	1/16W	M2,M3	R518			RK73GB1J824J	CHIP R	820K	J	1/16W	
R285			R92-1252-05	CHIP R	0 OHM				R519			RK73GB1J823J	CHIP R	82K	J	1/16W	
R286			RK73GB1J333J	CHIP R	33K	J	1/16W		R520			RK73GB1J334J	CHIP R	330K	J	1/16W	
R287			RK73GB1J223J	CHIP R	22K	J	1/16W		R521			RK73GB1J223J	CHIP R	22K	J	1/16W	
R288			R92-1371-05	FIXED R	180		1W		R522			RK73GB1J823J	CHIP R	82K	J	1/16W	
R289			RK73GB1J683J	CHIP R	68K	J	1/16W		R523			RK73GB1J103J	CHIP R	10K	J	1/16W	
R290			RK73GB1J472J	CHIP R	4.7K	J	1/16W		R524			RK73GB1J473J	CHIP R	47K	J	1/16W	
R291			RK73GB1J103J	CHIP R	10K	J	1/16W		R525			RK73GB1J103J	CHIP R	10K	J	1/16W	
R292			RK73GB1J392J	CHIP R	3.9K	J	1/16W		R526			RK73GB1J564J	CHIP R	560K	J	1/16W	
R293			RK73GB1J472J	CHIP R	4.7K	J	1/16W		R527			RK73GB1J104J	CHIP R	100K	J	1/16W	
R294			RK73GB1J274J	CHIP R	270K	J	1/16W		R528			RK73GB1J473J	CHIP R	47K	J	1/16W	
R295			RK73GB1J471J	CHIP R	470	J	1/16W		R529			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R296			R92-1252-05	CHIP R	0 OHM				R530			RK73GB1J684J	CHIP R	680K	J	1/16W	
R297			RK73GB1J473J	CHIP R	47K	J	1/16W		R531			RK73GB1J184J	CHIP R	180K	J	1/16W	
R298			RK73GB1J472J	CHIP R	4.7K	J	1/16W		R532			RK73GB1J473J	CHIP R	47K	J	1/16W	
R299			RK73GB1J471J	CHIP R	470	J	1/16W		R533			RK73GB1J822J	CHIP R	8.2K	J	1/16W	
R300			RK73GB1J274J	CHIP R	270K	J	1/16W		R534			RK73GB1J473J	CHIP R	47K	J	1/16W	
R301			RK73GB1J103J	CHIP R	10K	J	1/16W		R535			RK73GB1J333J	CHIP R	33K	J	1/16W	
R302			RK73GB1J392J	CHIP R	3.9K	J	1/16W		R536			RK73GB1J473J	CHIP R	47K	J	1/16W	
R303			RK73GB1J472J	CHIP R	4.7K	J	1/16W		R537			RK73GB1J103J	CHIP R	10K	J	1/16W	
R304			R92-0685-05	CHIP R	22	J	1/2W		R539			RK73GB1J103J	CHIP R	10K	J	1/16W	
R305			R92-0670-05	CHIP R	0 OHM				R541			R92-1252-05	CHIP R	0 OHM			
R310			RK73GB1J471J	CHIP R	470	J	1/16W	E,E3	R542,543			R92-0670-05	CHIP R	0 OHM			E,E3
R310			RK73GB1J471J	CHIP R	470	J	1/16W	M2,M3	R544			R92-0670-05	CHIP R	0 OHM			K,M2,M3
R311			R92-0685-05	CHIP R	22	J	1/2W		R545			RK73GB1J334J	CHIP R	330K	J	1/16W	
R312			RK73GB1J473J	CHIP R	47K	J	1/16W		R546			R92-0670-05	CHIP R	0 OHM			K,E,E3
R313			R92-1252-05	CHIP R	0 OHM				R547			RK73GB1J123J	CHIP R	12K	J	1/16W	
R314			RK73GB1J333J	CHIP R	33K	J	1/16W		R548			R92-1252-05	CHIP R	0 OHM			
R315			RK73GB1J222J	CHIP R	2.2K	J	1/16W		R549			RK73GB1J124J	CHIP R	120K	J	1/16W	
R316-320			RK73GB1J473J	CHIP R	47K	J	1/16W		R550			RK73GB1J274J	CHIP R	270K	J	1/16W	
R321			RK73GB1J472J	CHIP R	4.7K	J	1/16W		R551			RK73GB1J104J	CHIP R	100K	J	1/16W	
R322-324			RK73GB1J473J	CHIP R	47K	J	1/16W		R552			RK73GB1J473J	CHIP R	47K	J	1/16W	
R325			RK73GB1J102J	CHIP R	1.0K	J	1/16W		R553			RK73GB1J822J	CHIP R	8.2K	J	1/16W	

TM-V7A/E

TX-RX UNIT (X57-52XX-XX)

Ref. No.	Adrress	New parts	Parts No.	Description				Destination
R554			RK73GB1J682J	CHIP R	6.8K	J	1/16W	
R555			RK73GB1J223J	CHIP R	22K	J	1/16W	
R556			RK73GB1J224J	CHIP R	220K	J	1/16W	
R557			RK73GB1J473J	CHIP R	47K	J	1/16W	
R558			RK73GB1J123J	CHIP R	12K	J	1/16W	
R559			RK73GB1J473J	CHIP R	47K	J	1/16W	
R560			RK73GB1J274J	CHIP R	270K	J	1/16W	
R561			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R562-564			RK73GB1J473J	CHIP R	47K	J	1/16W	
R565			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R566			RK73GB1J564J	CHIP R	560K	J	1/16W	
R567			RK73GB1J224J	CHIP R	220K	J	1/16W	
R568			RK73GB1J473J	CHIP R	47K	J	1/16W	
R569			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R570			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R571			R92-1252-05	CHIP R	0 OHM			
R572			RK73GB1J334J	CHIP R	330K	J	1/16W	
R573-575			RK73GB1J473J	CHIP R	47K	J	1/16W	
R576			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R577			RK73GB1J472J	CHIP R	4.7K	J	1/16W	
R578			RK73GB1J103J	CHIP R	10K	J	1/16W	
R579			RK73GB1J152J	CHIP R	1.5K	J	1/16W	E,E3
R579			RK73GB1J822J	CHIP R	8.2K	J	1/16W	K,M2,M3
R580			RK73GB1J224J	CHIP R	220K	J	1/16W	
R581			RK73GB1J103J	CHIP R	10K	J	1/16W	
R582,583			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R584			RK73GB1J330J	CHIP R	33	J	1/16W	
R585			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R586			RK73GB1J224J	CHIP R	220K	J	1/16W	
R587,588			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R589			RK73GB1J104J	CHIP R	100K	J	1/16W	
R590			R92-1252-05	CHIP R	0 OHM			
R591			RK73GB1J100J	CHIP R	10	J	1/16W	
R592			RK73GB1J104J	CHIP R	100K	J	1/16W	
R593			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
R594			RK73GB1J103J	CHIP R	10K	J	1/16W	
R595			RK73GB1J474J	CHIP R	470K	J	1/16W	
R596			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R597			RK73GB1J473J	CHIP R	47K	J	1/16W	
R598			RK73GB1J222J	CHIP R	2.2K	J	1/16W	
R599			R92-1252-05	CHIP R	0 OHM			
R600			RK73GB1J103J	CHIP R	10K	J	1/16W	
R601			RK73GB1J473J	CHIP R	47K	J	1/16W	
R602,603			RK73GB1J102J	CHIP R	1.0K	J	1/16W	
VR1,2		*	R12-6718-05	SEMI VR	68K			
VR701,702		*	R31-0614-05	VARIABLE RESISTOR 50K				
S501			S70-0424-05	TACT SWITCH				
D1			DA221	DIODE				
D4,5			1SV214	DIODE(VARI CAP)				
D7,8			MA2S111	DIODE				
D9			MA2S077	DIODE				
D10,11			1SV214	DIODE(VARI CAP)				
D12			DA221	DIODE				
D13,14			1SV214	DIODE				

Ref. No.	Adrress	New parts	Parts No.	Description	Destination
D15			MA2S077	DIODE	
D16			DA221	DIODE	
D17,18			MA2S077	DIODE	
D19			DTZ5.6(A)	DIODE	
D20			1SS355	DIODE	
D21,22			MA2S077	DIODE	
D23			1SS355	DIODE	
D24			DAN222	DIODE	
D25			MA2S077	DIODE	
D26			MA2S077	DIODE	E,E3
D26			MA2S077	DIODE	M2,M3
D27			MA2S077	DIODE	
D28			1SS355	DIODE	
D29			MA2S111	DIODE	
D30,31			DA221	DIODE	
D32			MA742	DIODE	
D33			MA4PH633	DIODE	
D34			MI809	DIODE	
D35			MA4PH633	DIODE	
D36			MI809	DIODE	
D37-39			MA742	DIODE	
D40			DAN222	DIODE	
D41,42			MA742	DIODE	
D43			DSM3MA1	DIODE	
D44-47			MA2S077	DIODE	
D48		*	UDZ10(B)	DIODE	
D49		*	UDZ18(B)	DIODE	
D50			MA4PH633	DIODE	
D51			DSM3MA1	DIODE	
D52			HVU131	DIODE	
D501			1SS355	DIODE	
D502			DTZ7.5(B)	DIODE	
D503			MA112	DIODE	
D504,505			1SS355	DIODE	
D506,507			DA221	DIODE	
D508,509			MA2S111	DIODE	
IC1	2B		LA4446	IC(AF POWER AMP)	
IC2	2B		TA7808S	IC(REGULATOR)	
IC3	2B	*	S-AV17(KENW-1)	IC(POWER MODULE VHF)	
IC4	2B		M57788MR	IC(POWER MODULE/430-450MHz35W)	
IC6,7			MB1511PFV-GBND	IC(PLL FREQUENCY SYNTHESIZER)	
IC8,9			TC4S66F	IC(BILATERAL SWITCH)	
IC10		*	KCH28	HIC(UHF VCO)	
IC11			MB511PF-G-BND	IC(PRE SCALER)	
IC12		*	KCH27	HIC(VHF VCO)	
IC13			TK10930V	IC	
IC14			TC4W53FU	IC(2 INPUT NAND GATE)	
IC15			MC3372SV	IC(LO POWER FMIC)	
IC16			TA75S01F	IC(OP AMP)	
IC17			TA78L05F	IC(VOLTAGE REGULATOR/ +5V)	
IC18			BU4053BCF	IC	
IC19,20			BU2090FS	IC(SHIFT/STORE REGISTER)	
IC501			TA78L06F	IC(VOLTAGE REGULATOR/ +6V)	
IC502			TA78L05F	IC(VOLTAGE REGULATOR/ +5V)	

PARTS LIST

Ref. No.	Adress	New parts	Parts No.	Description	Destination	Ref. No.	Adress	New parts	Parts No.	Description	Destination
IC503			JLC1555F	IC(6X4 CLOSSPOINT SWITCH)		Q51			2SC5066(O)	TRANSISTOR	E,E3
IC504			MB87032APFGBND	IC(ELECTRONIC VOLUME)		Q51			2SC5066(O)	TRANSISTOR	M2,M3
IC505			PST9130NR	IC(SYSTEM RESET)		Q52			3SK241(R)	FET	E,E3
IC506			LC73881M	IC(DTMF DECODER)		Q52			3SK241(R)	FET	M2,M3
IC507			AK2343	IC(CTCSS ENCODER/DECODER)		Q53			2SC4093	TRANSISTOR	
						Q54			DTC114EE	DIGITAL TRANSISTOR	E,E3
IC508		*	78P058GCJRHC	IC(CPU)	K	Q54			DTC114EE	DIGITAL TRANSISTOR	M2,M3
IC508		*	78P058GCJRJC	IC(CPU)	E,E3	Q55			2SC4619(P,Q)	TRANSISTOR	
IC508		*	78P058GCJRJC	IC(CPU)	M2,M3	Q56			2SC4988	TRANSISTOR	
IC509			BU4066BCF	IC(ANALOG SWITCH X4)		Q57			2SC3357	TRANSISTOR	
IC510			JLC1555F	IC(6X4 CLOSSPOINT SWITCH)		Q58			2SC4738(GR)	TRANSISTOR	
IC511			TA75S393F	IC		Q60,61			2SC2954	TRANSISTOR	
IC512		*	AT25640N10SI27 IC	I		Q63			2SC4738(GR)	TRANSISTOR	
IC512		*	X25320SI-2.7	IC		Q66			2SB1565(E,F)	TRANSISTOR	
IC513		*	TC74HC4050AF	IC(BUFFER CONVERTER)		Q67			2SC4738(GR)	TRANSISTOR	
Q1			2SA1362(Y)	TRANSISTOR		Q69			2SB1386(R)	TRANSISTOR	
Q2			2SB1132(Q,R)	TRANSISTOR		Q71			DTC114EE	DIGITAL TRANSISTOR	
Q3			FMA5	TRANSISTOR		Q73,74			2SC4738(GR)	TRANSISTOR	
Q7			2SA1362(Y)	TRANSISTOR		Q75			DTD143EK	DIGITAL TRANSISTOR	
Q8,9			2SK1824	FET		Q76			2SC4738(GR)	TRANSISTOR	
Q10			2SB1132(Q,R)	TRANSISTOR		Q77			DTC114EE	DIGITAL TRANSISTOR	
Q11			3SK241(R)	FET		Q78			2SB1132(Q,R)	TRANSISTOR	
Q12			2SC4738(GR)	TRANSISTOR		Q79,80			DTC143EE	DIGITAL TRANSISTOR	
Q15			2SC4619(P,Q)	TRANSISTOR		Q81			DTC144EU	DIGITAL TRANSISTOR	
Q16,17			FMA5	TRANSISTOR		Q91			2SK1824	FET	
Q19,20			2SC4619(P,Q)	TRANSISTOR		Q501			2SC4738(GR)	TRANSISTOR	
Q21		*	3SK298	FET		Q504			2SA1519	TRANSISTOR	
Q23			3SK239A	FET		Q505,506			2SC4738(GR)	TRANSISTOR	
Q24			2SA1832(GR)	TRANSISTOR		Q507			2SK1824	FET	
Q25			2SC4738(GR)	TRANSISTOR		Q508,509			2SC4738(GR)	TRANSISTOR	
Q26			DTC144EE	DIGITAL TRANSISTOR		TH1			157-153-65001	THERMISTOR(15K)	
Q27			DTC114EE	DIGITAL TRANSISTOR							
Q28			SGM2014M	FET							
Q29			2SA1832(GR)	TRANSISTOR							
Q30			2SC4738(GR)	TRANSISTOR							
Q31			DTC114EE	DIGITAL TRANSISTOR							
Q32			3SK241(R)	FET							
Q33			2SK1824	FET							
Q34			2SC5066(O)	TRANSISTOR							
Q35			2SK1824	FET							
Q36			2SC4738(GR)	TRANSISTOR							
Q37			3SK239A	FET							
Q38			2SK879(Y)	FET							
Q39			DTC114EE	DIGITAL TRANSISTOR							
Q40			2SC4619(P,Q)	TRANSISTOR							
Q41			2SC4738(GR)	TRANSISTOR							
Q42			DTC114EE	DIGITAL TRANSISTOR							
Q43			2SK879(Y)	FET							
Q44			3SK241(R)	FET							
Q45,46			2SC5066(O)	TRANSISTOR							
Q47			2SC4619(P,Q)	TRANSISTOR							
Q48			DTC114EE	DIGITAL TRANSISTOR							
Q49			2SC5066(O)	TRANSISTOR	E,E3						
Q49			2SC5066(O)	TRANSISTOR	M2,M3						
Q50			SGM2014M	FET							

TM-V7A/E

EXPLODED VIEW

A		:N14-0569-04
B	M2.6x6(OC)BLK	:N33-2606-45
C	M3x8	:N67-3008-46
D	BLK	:N80-2010-45
E	BLK	:N80-2610-45
F		:N83-2005-46
G		:N83-2608-46
H	M2.6x6(Bi-Tap)	:N87-2606-46

Parts with the exploded numbers larger than 700 are not supplied.

PACKING

59 Polystyrene Foamed Board
(H11-0890-04)

26 DC Cord
(E30-2111-15)

40 Fuse (20A)
(F51-0018-05)

60 Bag
(H25-0103-04)

38 Fuse (15A)
(F51-0017-05)

40

MIC
(T91-0396-05) : M2, E, E3
(T91-0568-05) : K, M3

62 Bag
(H25-0723-04)

77 Screw Set
(N99-0331-05)

65 Bracket
(J29-0632-03)

63 Item Carton Case
(H52-0920-02) : K
(H52-0921-02) : M2, M3
(H52-0922-02) : E, E3

58 Polystyrene Foamed Fixture
(H10-6608-01)

Warranty Card
15 (B46-0310-03) : E, E3
16 (B46-0410-40) : K
Instruction Manual
17 (B62-0678-00) : K, M2, M3, E
18 (B62-0679-00) : E
19 (B62-0680-00) : E, E3
20 (B62-0681-00) : M3, E3
21 (B62-0682-00) : E3
22 (B62-0683-00) : M2
23 (B62-0715-00) : E3
61 Bag
(H25-0337-04)

UPC Code Label

TM-V7A/E

ADJUSTMENT

Measuring Equipment for Adjustment

1. **Digital voltmeter (D.V.M)**
   Input impedance: High

2. **RF valve voltmeter (RF V.M)**
   Input impedance: 1MΩ or more, 2 pF or less
   Voltage range: Full scale = 10mV to 300V
   Measurable frequency range: up to 450MHz

3. **Frequency counter (f. counter)**
   Input sensitivity: About 50mV
   Measurable frequency: 450MHz or more

4. **DC power supply**
   Voltage: Variable in the range 10 to 17V
   Current: 13A or more

5. **Power meter**
   Measurement power: 60W, 30W, 10W
   Impedance: 50Ω
   Measurable frequency: 450MHz

6. **AF valve voltmeter (AF V.M)**
   Input impedance: 1MΩ or more
   Voltage range: Full scale = 1mV to 30 V
   Measurable frequency range: 50Hz to 10kHz

7. **AF generator (AG)**
   Output frequency: 100Hz to 10kHz
   Output voltage: 0.5mV to 1V

8. **Line detector**
   Measurable frequency: 450MHz

9. **Spectrum analyzer**
   Measurable frequency: 450MHz

10. **Directional coupler**

11. **Oscilloscope**
    High sensitivity with horizontal input terminal

12. **Standard signal generator (SSG)**
    The standard signal generator must be able to generate the 1GHz band frequencies and vary the amplitude and frequency.
    Output: -133dBm to greater than -13dBm

13. **Dummy load (for AF)**
    8Ω, about 5W

14. **Noise generator**
    The noise generator must be able to generate noise similar to ignition noise containing high-frequency components of 450MHz or more.

15. **Sweep generator**
    The sweep generator must be able to sweep the 144 and 430MHz bands.

16. **Tracking generator**

17. **Adjustment jig**

Preparation

● Set the controls and switches to the positions listed below unless otherwise specified.

VOL control	Fully counterclockwise
SQL control	Fully counterclockwise
POWER switch	OFF
(For fixed stations) DC power supply POWER switch	OFF

UP ——————— DWN
8C : DC 8V ——————— R.D : Transmission band
100mA max. ——— detection output (100mV/ 10k Ω)
GND ——————— MIC
STBY (PTT) ——————— GND (MIC)
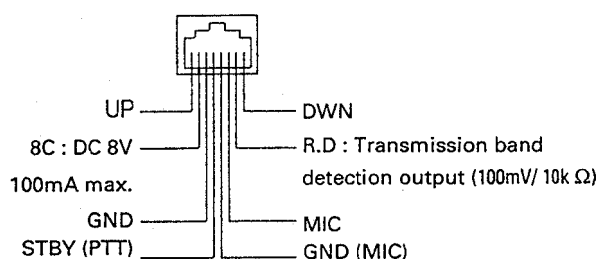
Microphone socket
(as viewed from the front of the set)

● Use an insulated rod, such as a plastic rod, for adjustment (especially for trimmers, coils, etc.).
● To protect the signal generator, never connect the microphone to the microphone socket when the receiver section is adjusted.
● Before the power cord is connected, make sure the power switch is off.
● Without specification of SSG, standard modulation is applied (MOD : 1kHz, DEV : ±3kHz, AF output : 0.63V / 8Ω)
● See the instruction manual for transmit and receive operations.

ADJUSTMENT

Adjustment Service Jig
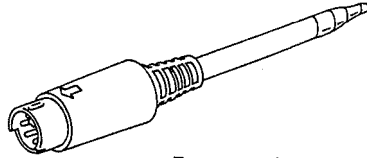
Data terminal short plug (W05-0611-00)

●Service jigs usage

⑥(SQC) ⑤(PRI)

④(PR9) ——— ③(PKS)

E(GND)

②(DE) ①(PKD)

Pin assignment seen from direction B

B
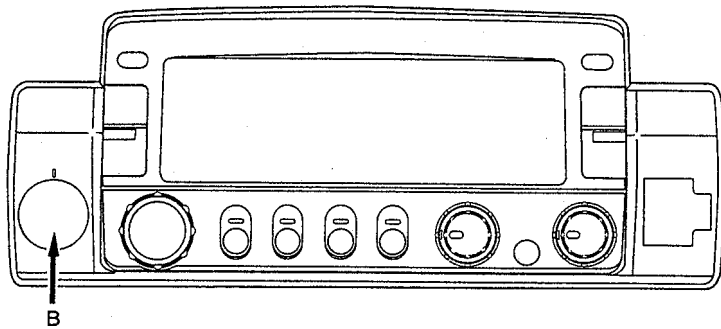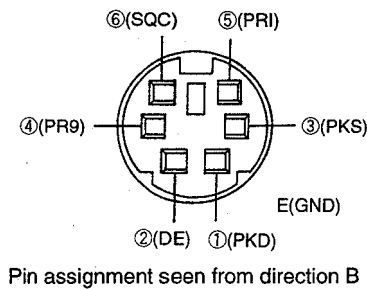
Short plug
Terminals ③ and ⑥ are short circuited.

[Reference] ③ PKS (SEND switch for DATA terminal)
Connect PTT output. If PKS is set to "L",
data are sent and the microphone will be mute.
⑥ SQC (Squelch control output)
This outputs squelch control output.

●Service jigs specification

Plug cable with 6P mini-DIN : Model PG-5A (cable parts No. : E30-3202-05) processed like under fig.

Shield wire
E
1 Brown
2 Red
3 Orange
4 Yellow
5 Green
6 Blue

A ——

Approx. 1m

(Cut the cable at suitable length.)

Bracket
5   6

3 ——— 4

1   2

Pin assignment seen from
direction A
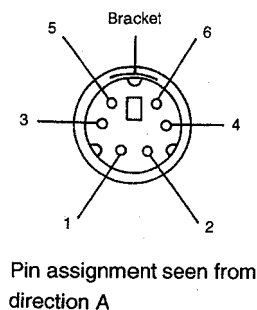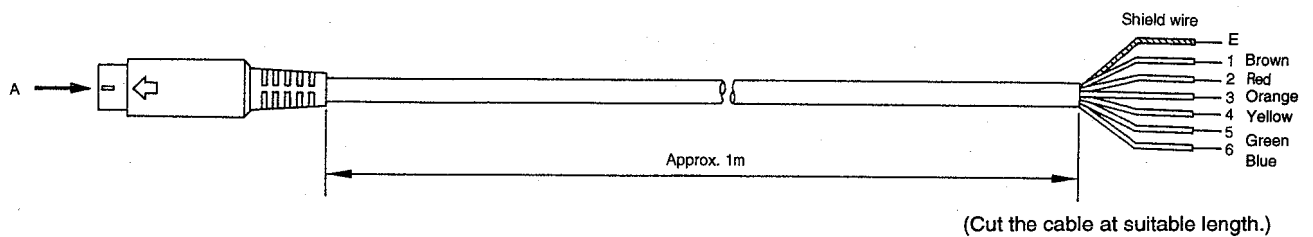
DIN pin No.	Color
1	Brown
2	Red
(3)	Orange
4	Yellow
5	Green
(6)	Blue
Bracket	Shield

Join these DIN pins.

Cut unnecessary wires
at the bottom and wind
insulation tape around
top edge.

Orange wire

Short circuit
(Soldering)

Blue wire

43
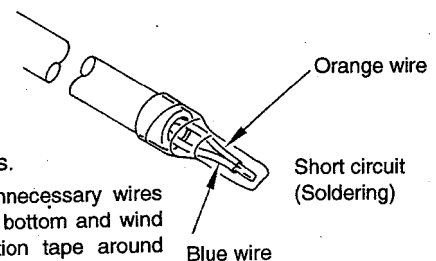
TM-V7A/E

ADJUSTMENT

Parts layout

Front panel

VOL(PRESS:BAND SEL)

CALL

Power

PM

VFO

MENU

MR

Data terminal

F   TONE   REV   SQL   SQL

Encode   MHz   LOW   CONT SEL   MIC

Rear panel

ANT   SP1   SP2
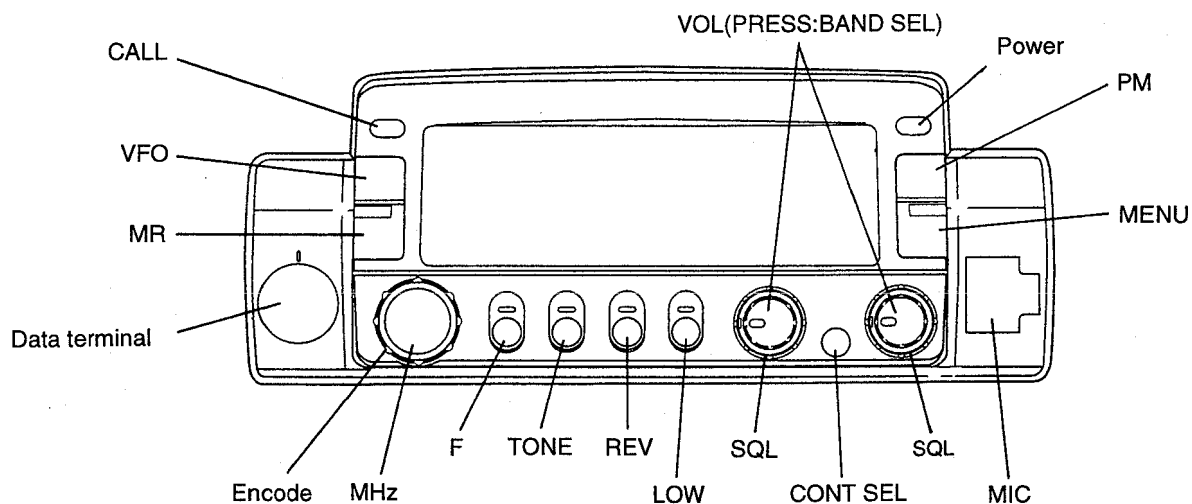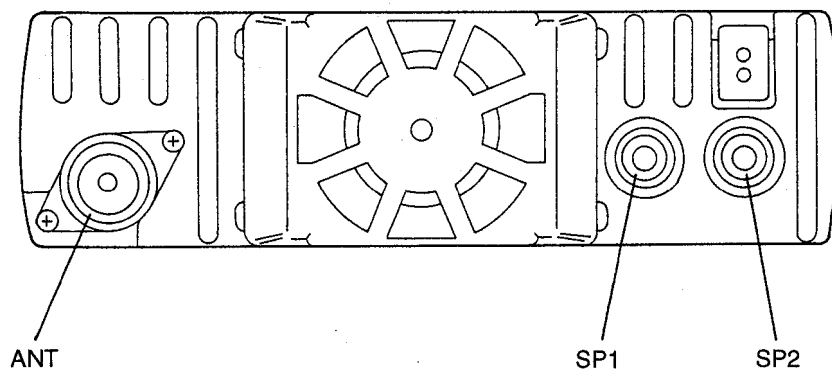
Adjustment parts layout

● TX-RX UNIT
(Unit under)

● Adjustment parts No.

TC1 : Transmission frequency(UHF)

L6 : BPF(VHF)

L12 : BPF(VHF)

L17 : BPF(VHF)

VR1 : DEV(VHF)

VR2 : DEV(UHF)

● Test point

CVV : VCO lock voltage (VHF)
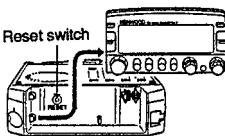
CVU : VCO lock voltage (UHF)

SMV : BPF

L6

L12

L17

VR2 VR1   SMV

CVV TC1   CVU

CN1   CN2
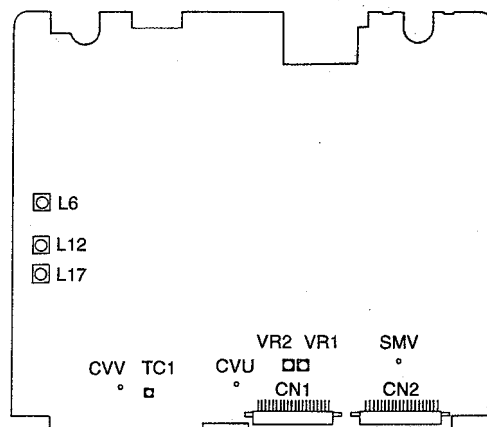
ADJUSTMENT

Common section

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Setting	1) Power voltage:13.8V							
	2) VOL:SQL knob:MIN							

| 2. Reset | ●VFO reset of full band
Return the setting contents of the full band of VFO to the original status at factory shipment.
However, the contents of call channel, memory channel, program scan memory, memory channel lock out, and PM are not reset.
OPERATION
1. Turn OFF the power by depressing (PWR) key, while depressing (VFO) key, turn ON the power by depressing (PWR) key.
"VFO Reset? Press [VFO]" is displayed.

VFO Reset?
Press [VFO]

2. Depress (VFO) key.
Confirmation sound will be heard and full band data of VFO is reset. If you do not operate anything for 10 seconds, or press any key other than (VFO) key, the set does not execute VFO reset and return to frequency display. | ●Hardware reset
If abnormal display or abnormal activity has occurred caused by static electricity, electric lighting etc., reset the set with the following procedures.

Reset switch

OPERATION
1. Press (PWR) key while connecting the power cable to turn ON the power.
2. Remove the panel.
Refer to the page 11 for removing method.
3. Press the reset switch (within 0.5 second)
If pressing the reset switch for less than 1 second, the memory contents are not reset.
If this switch is pressed longer than 1 second, the memory contents are reset. | ●All reset
Return all the data to the original status at factory shipment. Do not interrupt your operation during resetting.
OPERATION
1. Turn OFF the power by depressing (PWR) key.
2. While depressing (MR) key, turn ON the power by depressing (PWR) key.
1 second is required to light on all LCD.
Do not release (MR) key until all LCD lights on.
3. Release (MR) key.
"All Reset?Press [MR]" is displayed.

All Reset?
Press [MR]

4. Depress (MR) key again.
Confirmation sound will be heard and all the data is reset and the display returns to the initial value.
If you do not operate anything for 10 seconds, or depress any key other than (MR) key, the set does not execute VFO reset and return to frequency display. |

3. For adjustment Enter the memory frequency (Use this at the time of checking and operation confirmation.)	1) (PWR) Turn off this control and insert the short tool into the data terminal of the set. 2) Turn ON (PWR) while depressing (F) key and (TONE) key simultaneously. 3) Memory entering mode activates and the values shown in the table right are entered automati-cally. 4) Turn OFF (PWR) and pull out the short plug. 5) Perform all reset when erasing the entered memory contents.	`<List of memory frequency>` (see table below)

<List of memory frequency>

			K	M (M2, M3)	E (E, E3)	(TONE)
(VHF-CH)						
CH	1	(RX Center)	146.050	146.050	145.050	
CH	2	(RX Low)	144.050	144.050	144.050	
CH	3	(RX High)	147.925	147.925	145.925	
CH	4	(TX Center)	146.000	146.000	144.975	
CH	5	(TX Low)	144.000	144.000	144.000	
CH	6	(TX High)	147.975	147.975	145.975	
CH	7	(CTCSS)	145.100	145.100	145.100	CT (88.5Hz)
CH	8	(CTCSS)	145.100	145.100	145.100	CT (151.4Hz)
CH	9	(DTSS)	145.200	145.200	145.200	DT (123)
CH	10	(DTSS)	145.200	145.200	145.200	DT (456)
CH	11		118.050	118.050	118.050	
CH	12		129.950	129.950	129.950	
CH	13		136.050	136.050	136.050	
CH	14		173.950	173.950	173.950	
(UHF-CH)						
CH	1	(RX Center)	444.050	435.050	435.050	
CH	2	(RX Low)	438.050	430.050	430.050	
CH	3	(RX High)	449.925	439.925	439.925	
CH	4	(TX Center)	444.000	435.000	435.000	
CH	5	(TX Low)	438.000	430.000	430.000	
CH	6	(TX High)	449.975	439.975	439.975	
CH	7	(CTCSS)	445.100	435.100	435.100	CT (88.5Hz)
CH	8	(CTCSS)	445.100	435.100	435.100	CT (151.4Hz)
CH	9	(DTSS)	445.200	435.200	435.200	DT (123)
CH	10	(DTSS)	445.200	435.200	435.200	DT (456)
CH	11		410.050	410.050	---------	
CH	12		469.975	469.975	---------	
CH	13		370.100	370.100	370.100	
CH	14		---------	870.100	870.100	

4. Lock voltage	1) VHF band...CH1 FREQ.:146.050MHz:K,M FREQ.:145.050MHz:E	DC V.M	TX-RX	CVV (TP6)	Check			1.9~3.0V
	2) UHF band...CH1 FREQ.:444.050MHz:K FREQ.:435.050MHz:M,E			CVU (TP7)				3.5~5.5V:K 3.0~5.0V:M,E
	3) UHF band FREQ.:443.980MHz:K FREQ.:434.980MHz:M,E transmission	Power meter DC V.M	Rear panel	ANT CVU (TP7)				2.0~4.0V:K 1.5~4.0V:M,E
	4) VHF band FREQ.:145.980MHz:K,M FREQ.:144.980MHz:E transmission			CVV (TP6)				1.4~2.5V

TM-V7A/E

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
5. BPF	1) FREQ....CH1 :146.050MHz:K,M :145.050MHz:E SSG:-93dBm	SSG DC V.M	TX-RX Rear panel	ANT SMV (TP5)	TX-RX	L6 L12 L17	Voltage max	2.5V or more

Carry out the following procedures after rising up the set in the adjustment mode.

Method of rising up the adjustment mode (Mode for adjustment and level setting)

1. Turn OFF (PWR) and insert the short plug into the data terminal of the set.
2. After 1 second of turning ON (PWR) while depressing the (F) key and the (TONE) key simultaneously, all LCDs light on and the screen will be white.
3. When setting all keys to free, the right figure will be displayed on the screen.

> All Reset?
> Press [MR]

4. All reset is executed when (MR) key is depressed. The frequencies which are specified by frequency entering mode will be entered and the next procedure is executed. However, when any key other than (MR) key is depressed or no operation is activated for 10 seconds, the adjustment mode is released.

5. Key operation
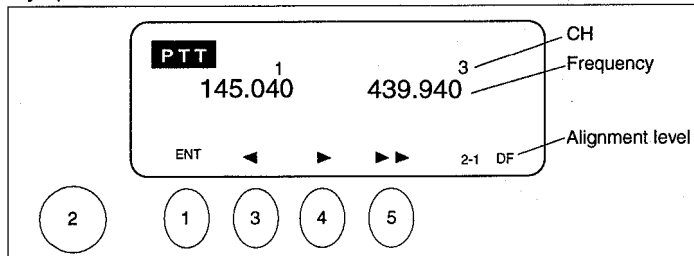
1. ENT Key · · · Decide the setting value and proceed to the next step.
   * During adjustment of transmission system, depress ENT key after turning OFF the transmission.
2. ENC Knob · · · UP/DOWN for the setting value
3. ▶ key · · · · · Return to the previous step
4. ◀ key · · · · · Proceed to the next step
5. ▶▶ key · · · · · Change the adjustment item
(Note) Adjustment mode is released when turning OFF (PWR).

6. Refer to the separate table on page 50 for the adjustment items and their contents of the set.

Receiver section

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. High level input S/N and distortion	1) V band...CH1 step 1-1 FREQ.:146.050MHz:K,M FREQ.:145.050MHz:E SSG:−53dBm AF output:2.83V/8 Ω	Oscilloscope AF V.M SSG Distortion meter	Rear panel	EXT. SP2			Check	S/N 44dB or more Distortion rate: 5% or less
	2) U band...CH1 step 1-2 FREQ.:444.050MHz:K FREQ.:435.050MHz:M,E SSG:−53dBm AF output:2.83V/8 Ω			EXT. SP1				S/N 42dB or more Distortion rate: 5% or less

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
2. Sensitivity	1) V band step 2-1 FREQ.:CH1 step 2-2 FREQ.:CH2 step 2-3 FREQ.:CH3 SSG:−122dBm	Distortion meter Oscilloscope AF V.M	Rear panel	EXP. SP1			Check	SINAD 12dB or more
	2) U band step 2-4 FREQ.:CH1 step 2-5 FREQ.:CH2 step 2-6 FREQ.:CH3 SSG:−122dBm							SINAD 12dB or more
	3) U2 band step 2-7 FREQ.:CH1 SSG:−118dBm							SINAD 12dB or more
	4) V2 band step 2-8 FREQ.:CH1 SSG:−118dBm							SINAD 12dB or more
3. Squelch	1) V band step 3-1 FREQ.:CH1 Set to the point where noise will be erased by turning the squelch knob.	Oscilloscope SSG	Rear panel	EXP. SP1			Check	Knob position: 8:00~11:00 BUSY lights off.
	2) SSG:−130dBm							Squelch open. BUSY lights on.
	3) Squelch knob: clockwise MAX							AF output disappear. BUSY lights off.
	4) U band step 3-2 FREQ.:CH1 Set to the point where noise will be erased by turning the squelch knob.							Knob position: 8:00~11:00 BUSY lights off.
	5) SSG:−130dBm							Squelch open. BUSY lights on.
	6) Squelch knob: clockwise MAX							AF output disappear. BUSY lights off.
	7) U2 band step 3-3 FREQ.:CH1 SSG:−125dBm							Squelch open. Note: If not squelch opened, minimum 20dB NQ is acceptable.
	8) V2 band step 3-4 FREQ.:CH1 SSG:−125dBm							

TM-V7A/E

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
4. S-meter	1) V band step 4-1 FREQ.:CH1 SSG:−118dBm	SSG	Rear panel	ANT			Check	S-meter one segment (S1) lights on.
	2) step 4-2 SSG:−96dBm							S-meter all segments (S7) lights on.
	3) U band step 4-3 FREQ.:CH1 SSG:−118dBm							S-meter one segment (S1) lights on.
	4) step 4-4 SSG:−96dBm							S-meter all segments (S7) lights on.
	5) U2 band step 4-5 SSG:−116dBm							S-meter one segment (S1) lights on.
	6) step 4-6 SSG:−96dBm							S-meter all segments (S7) lights on.
	7) V2 band step 4-7 SSG:−116dBm							S-meter one segment (S1) lights on.
	8) step 4-8 SSG:−96dBm							S-meter all segments (S7) lights on.
	9) U-800 band step 4-9 FREQ.:CH14 SSG:−105dBm							S-meter one segment (S1) lights on.
	10) step 4-10 SSG:−85dBm							S-meter all segments (S7) lights on.
	11) U-300 band step 4-11 FREQ.:CH13 SSG:−110dBm							S-meter one segment (S1) lights on.
	12) step 4-12 SSG:−90dBm							S-meter all segments (S7) lights on.
	13) V-118 band step 4-13 FREQ.:CH11 SSG:−100dBm							S-meter one segment (S1) lights on.
	14) step 4-14 SSG:−83dBm							S-meter all segments (S7) lights on.

ADJUSTMENT

Transmission section

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Transmission frequency	1) U band FREQ.:444.000MHz:K FREQ.:435.000MHz:M,E	f.counter Dummy	Rear panel	ANT	TX-RX (A/4)	TC1	444.000MHz:K 435.000MHz:M,E	Not warm up the set. ±100Hz
2-1. POWER VHF band	1) POWER:LOW step6-1 FREQ.:CH4 Transmission.	Power meter Ammeter	Rear panel	ANT	Display	Encode	UP/DOWN	5.0W±0.5W
	2) POWER:MID step6-2 Transmission.							12.0W±1.0W
	3) POWER:MAX step6-3 Transmission.						Check	48.0W
	4) POWER:HI step6-3 Transmission.				Display	Encode	UP/DOWN	MAX Power 52W or more . 50.0W±1.0W MAX Power 48W or more . (MAX Power −2W) ±1.0W
	5) FREQ.:CH5 POWER:HI Transmission.						Check	44~60W
	6) POWER:MID Transmission.							10~14W
	7) POWER:LOW Transmission.							3~10W
2-2. POWER UHF band	1) POWER:LOW step6-4 FREQ.:CH4 Transmission.	Power meter	Rear panel	ANT	Display	Encode	UP/DOWN	5.0W±0.5W
	2) POWER:MID step6-5 Transmission.							12.0W±1.0W
	3) POWER:MAX step6-6 Transmission.						Check	33.0W or more
	4) POWER:HI step6-6 Transmission.				Display	Encode	UP/DOWN	MAX Power 37W or more . 35.0W±1.0W MAX Power 33W or more . (MAX Power −2W) ±1.0W
	5) FREQ.:CH5 FREQ.:CH6 POWER:HI Transmission.						Check	28~42W
	6) POWER:MID Transmission.							10~14W
	7) POWER:LOW Transmission.							1~4W

TM-V7A/E

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
3. DEV	1) V band Step 7-1 FREQ.:CH4 AG:1kHz25mV:E AG:1kHz50mV:K,M Transmission	Linear detector Oscilloscope AG	Rear panel	ANT	TX-RX	VR2	±4.2kHz (+, − with a larger value)	±200Hz
	2) Down AG output from the above state by 20dB (1kHz/2.5mV):E 20dB (1kHz/5.0mV):K,M Transmission						Check	±2.3～4.2kHz:E ±2.4～4.1kHz:K,M
	3) U band Step 7-2 FREQ.:CH4 AG:1kHz25mV:E AG:1kHz50mV:K,M Transmission				TX-RX	VR1	±4.2kHz (+, − with a larger value)	±200Hz
	4) Down AG output from the above state by 20dB (1kHz/2.5mV):E 20dB (1kHz/5.0mV):K,M Transmission						Check	±2.3～4.2kHz:E ±2.4～4.1kHz:K,M
4. TONE	1) V band Step 8-1 FREQ.:CH7 Transmission	Linear detector Oscilloscope	Rear panel	ANT			Check	±0.5～1.3kHz
	2) U band Step 8-2 FREQ.:CH7 Transmission							
5. Protection	1) V band Step 10-1 FREQ.:CH4 ANT:short circuit and open Transmission	Ammeter					Check	12.0A or less
	2) U band Step 10-2 FREQ.:CH4 ANT:short circuit and open Transmission							10.0A or less

[Reference] Adjustment modes and their contents of the set

No.	Item	Information display	Remarks
1	All displays lighting	"All lighting"	LCD lights off when depressing [F] and [TONE] keys.
	All reset	"All Reset? Press[MR]"	All reset is executed by depressing [MR] key. All reset is not executed by depressing other than [MR] key.
2	High level input S/N, Distortion,	[1-1]	VHF(V-C), MR1ch
	AF output and Current confirmation	[1-2]	UHF(U-C), MR1ch
3	Receiving sensitivity confirmation	[2-1]	VHF(V-C), MR1ch
		[2-2]	VHF(V-L), MR2ch
		[2-3]	VHF(V-H), MR3ch
		[2-4]	UHF(U-C), MR1ch
		[2-5]	UHF(U-L), MR2ch
		[2-6]	UHF(U-H), MR3ch
		[2-7]	UHF(SU-C), U×U ON, MR1ch
		[2-8]	VHF(SV-C), V×V ON, MR1ch

ADJUSTMENT

No.	Item	Information display	Remarks
4	Squelch open sensitivity setting	[3-1XX]	VHF(V-C), MR1ch, set with [ENT] key
		[3-2XX]	UHF(U-C), MR1ch, set with [ENT] key
		[3-3XX]	UHF(SU-C), MR1ch, U×U ON, set with [ENT] key
		[3-4XX]	VHF(SV-C), MR1ch, V×V ON, set with [ENT] key
5	S-meter adjustment setting	[4-1XX]	VHF(V-C), MR1ch, set with [ENT] key (One light on setting)
		[4-2XX]	VHF(V-C), MR1ch, set with [ENT] key (Seven lights on setting)
		[4-3XX]	UHF(U-C), MR1ch, set with [ENT] key (One light on setting)
		[4-4XX]	UHF(U-C), MR1ch, set with [ENT] key (Seven lights on setting)
		[4-5XX]	UHF(SU-C), U×U ON, MR1ch, set with [ENT] key (One light on setting)
		[4-6XX]	UHF(SU-C), U×U ON, MR1ch, set with [ENT] key (Seven lights on setting)
		[4-7XX]	VHF(SV-C), V×V ON, MR1ch, set with [ENT] key (One light on setting)
		[4-8XX]	VHF(SV-C), V×V ON, MR1ch, set with [ENT] key (Seven lights on setting)
		[4-9XX]	UHF(800), 800MHz ON, MR14ch, set with [ENT] key (One light on setting)
		[4-10XX]	UHF(800), 800MHz ON, MR14ch, set with [ENT] key (Seven lights on setting)
		[4-11XX]	UHF(300), MR13ch, set with [ENT] key (One light on setting)
		[4-12XX]	UHF(300), MR13ch, set with [ENT] key (Seven lights on setting)
		[4-13XX]	VHF(118), MR11ch, set with [ENT] key (One light on setting)
		[4-14XX]	VHF(118), MR11ch, set with [ENT] key (Seven lights on setting)
6	Unused	[5-1]	VHF(V-C)、MR1ch
		[5-2]	UHF(U-C)、MR1ch
7	Transmission output setting	[6-1XX]	VHF(V-C)、MR4ch、LOW、[ENC]:Output adjustment, [ENT]:Setting *
		[6-2XX]	VHF(V-C)、MR4ch、MID、[ENC]:Output adjustment, [ENT]:Setting
		[6-3XX]	VHF(V-C)、MR4ch、HI、[ENC]:Output adjustment, [ENT]:Setting
		[6-4XX]	UHF(U-C)、MR4ch、LOW、[ENC]:Output adjustment, [ENT]:Setting *
		[6-5XX]	UHF(U-C)、MR4ch、MID、[ENC]:Output adjustment, [ENT]:Setting
		[6-6XX]	UHF(U-C)、MR4ch、HI
8	Deviation confirmation	[7-1]	VHF(V-C)、MR4ch
		[7-2]	UHF(U-C)、MR4ch
9	Tone	[8-1]	VHF(V-C)、MR7ch
		[8-2]	UHF(U-C)、MR7ch
10	Spurious abnormal oscillation	[9-1]	VHF(V-C)、MR4ch
		[9-2]	VHF(V-L)、MR5ch
		[9-3]	VHF(V-H)、MR6ch
		[9-4]	UHF(U-C)、MR4ch
		[9-5]	UHF(U-L)、MR5ch
		[9-6]	UHF(U-H)、MR6ch
21	Protection	[10-1]	VHF(V-C)、MR4ch
		[10-2]	UHF(U-C)、MR4ch
22	Data terminal	[11-1]	UHF(U-C)、MR15ch、1200bps
		[11-2]	UHF(U-C)、MR15ch、9600bps

Note: For "XX" in (4) squelch open sensitivity confirmation, (5) S-meter adjustment setting, and (7) send transmission output setting, the set data is displayed with two digits of HEX data.

Note: For (7) send transmission output setting, FF (full power) should be an initial value at the time of first power ON with EEPROM.

Note: For (10) spurious abnormal oscillation, the transmission output changes in the order $\rightarrow H \rightarrow M \rightarrow L$ with each depression of the [MNU] key.

TM-V7A/E PC BOARD VIEWS

LCD ASSY (B38-0772-15)
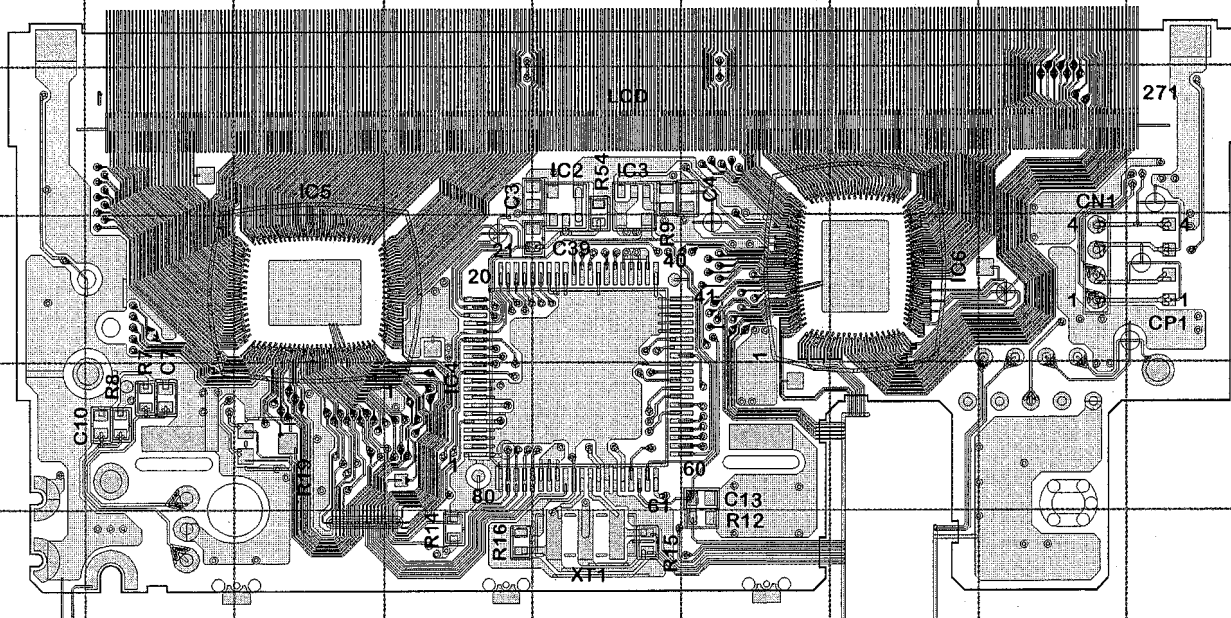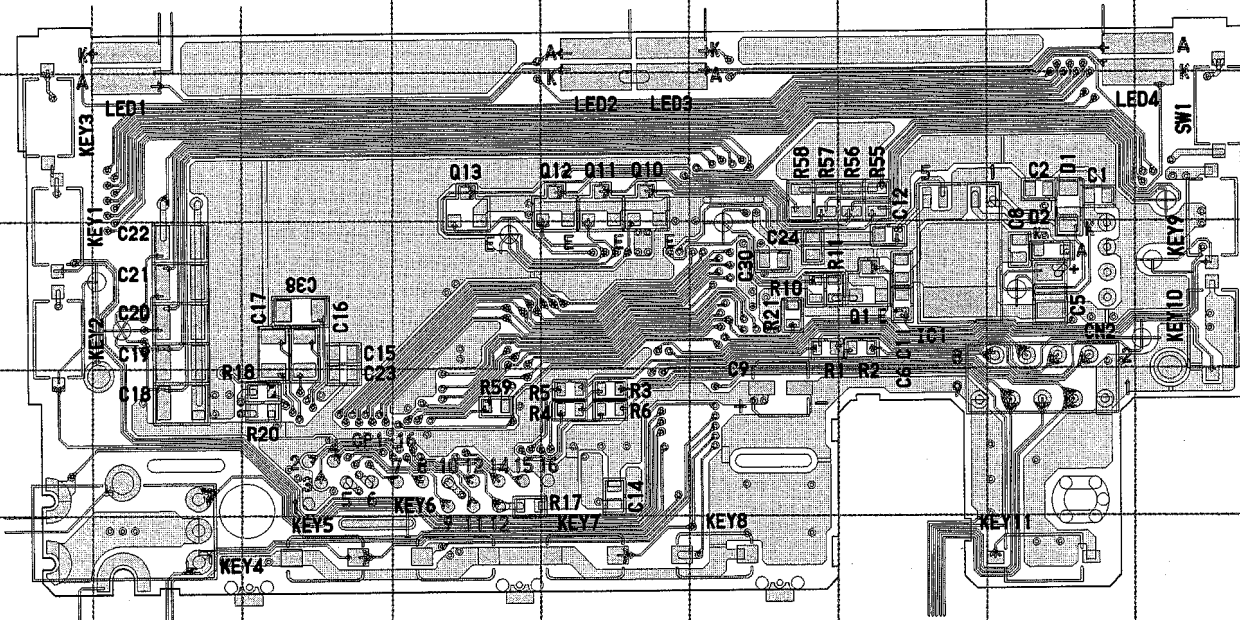
TX-RX UNIT (X57-523X-XX, X57-527X-XX:S) (A/3)
Component Side View

TX-RX UNIT (X57-523X-XX, X57-527X-XX:S) (A/3)

2SB1132 2SK1824 2SB1565 DTC114EE
DTD143EK
2SA1519
2SC4738

TX-RX UNIT (A/3)
(Component side)

Ref. NO.	Address
IC1	10M
IC2	7M
IC3	9D
IC4	9G
IC6	3G
IC7	3D
IC10	3G
IC12	3D
IC14	5J
IC17	4M
IC19	5L
IC20	5L
Q12	3F
Q19	3H
Q36	3G
Q38	3C
Q41	3D
Q63	7J
Q66	11I
Q69	7L
Q71	7L
Q73	4I
Q74	7I
Q75	10H
Q76	4L
Q78	3L
Q91	5K
D7	3G
D8	3E
D16	3D
D20	3G
D23	3D
D38	6J
D48	4L

LA4446

S-AV17

M57788MR

TK10930V
AK2343
MB87032APFGBND

BU2090FS

PST9130NR
TA75S393F

TC74HC4050AF

2SK879

BU4066BCF

MB511PF-G-BND
TA7808S

TA78L05F
VREF
VIK
GND

TA78L06F
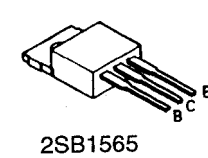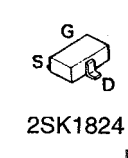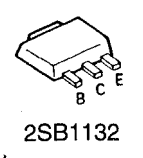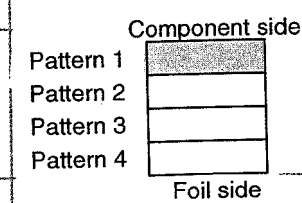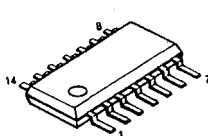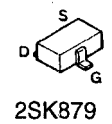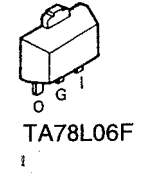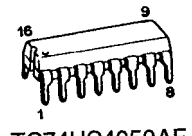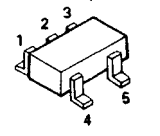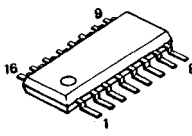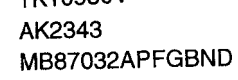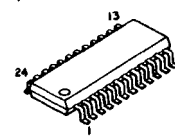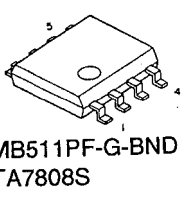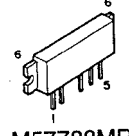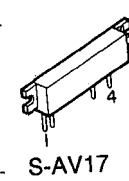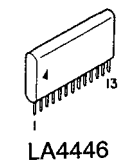
53

TX-RX UNIT (A/3)
(Foil side)

Ref. NO.	Address
IC8	3U
IC9	3X
IC11	5W
IC13	5R
IC15	7S
IC16	10T
IC18	10Q
Q1	6P
Q2	6P
Q3	6P
Q7	5P
Q8	8Q
Q9	9Q
Q10	6P
Q11	8Y
Q15	3V
Q16	5P
Q17	5P
Q18	5P
Q20	3Y
Q23	9U
Q24	3U
Q25	3U
Q26	7W
Q27	5X
Q28	5Y
Q29	3X
Q30	3X
Q31	6X
Q32	6X
Q33	4S
Q34	8V
Q35	4S
Q37	7U
Q39	7W
Q40	5S
Q42	7V
Q43	5R
Q44	6W
Q45	3V
Q46	4X
Q47	4T
Q48	6U
Q49	9U
Q50	6V
Q51	8U
Q52	8U
Q53	4V
Q54	8U
Q55	6S
Q56	4X
Q57	5V
Q58	5R
Q60	5V
Q61	4W
Q67	10T
Q77	3P
Q81	11U
D1	9Q
D4	8Y
D5	8Y
D9	7X
D10	6Y
D11	6X
D13	6Y
D14	6Y
D15	8Y
D17	8V
D18	4Y
D19	6X
D21	5U
D22	7V

Ref. NO.	Address	Ref. NO.	Address
D24	8V	D39	10V
D26	5U	D40	10T
D27	4X	D41	10Y
D28	4X	D42	10Y
D29	9U	D43	9S
D30	4W	D44	4Y
D31	5V	D45	4Y
D32	6R	D46	4Y
D33	9V	D47	5U
D34	10U	D49	3P
D35	9W	D50	9W
D36	9Y	D51	8R
D37	10V	D52	9V

DTC114EE
DTC144EU
2SA1362
2SA1832
2SC4619
2SC4738

FMA5

54

Component side

Pattern 1	
Pattern 2	
Pattern 3	
Pattern 4	

Foil side

J72 – 0500 – 11
X57 – 5230 – 00 (A/3)
X57 – 5270 – 00 (A/3)

-527X-XX:S) (A/3) Foil Side View

TX-RX UNIT (X57-523X-XX, X57-527X-XX:S) (A/3) Component Side + Foil Side View

TX-RX UNIT(A/3)
(Component side)
+ (Foil side)

Ref. NO.	Address
IC1	10AL
IC2	7AL
IC3	9AC
IC4	9AF
IC6	3AF
IC7	3AC
IC8	3AF
IC9	3AC
IC10	3AF
IC11	5AD
IC12	3AC
IC13	5AI
IC14	5AI
IC15	7AI
IC16	10AG
IC17	4AL
IC18	10AJ
IC19	5AK
IC20	6AK
Q1	6AK
Q2	6AB
Q3	6AK
Q7	5AK
Q8	8AJ
Q9	9AJ
Q10	6AK
Q11	8AC
Q12	3AE
Q15	3AE
Q16	5AK
Q17	5AK
Q18	5AK
Q19	3AI
Q20	3AC
Q23	9AF
Q24	3AF
Q25	3AF
Q26	7AD
Q27	5AC
Q28	5AB
Q29	3AC
Q30	3AC
Q31	6AC
Q32	6AC
Q33	4AH
Q34	8AE
Q35	4AH
Q36	3AF
Q37	7AF
Q38	3AB
Q39	7AD
Q40	5AI
Q41	3AC
Q42	7AE
Q43	5AI
Q44	6AD
Q45	3AE
Q46	4AC
Q47	4AG
Q48	6AF
Q49	9AF
Q50	6AE
Q51	8AF
Q52	8AF
Q53	4AE
Q54	8AG
Q55	6AI
Q56	4AD
Q57	5AE
Q58	5AI
Q60	5AE
Q61	4AD

Ref. NO.	Address	Ref. NO.	Address	Ref. NO.	Address	Ref. NO.	Address	Ref. NO.	Address
Q63	7AI	D1	9AJ	D18	4AB	D32	6AJ	D45	4AB
Q66	11AH	D4	8AB	D19	6AD	D33	9AE	D46	4AE
Q67	10AG	D5	8AB	D20	3AF	D34	10AD	D47	5AF
Q69	7AK	D7	3AF	D21	5AF	D35	9AD	D48	4AK
Q71	7AK	D8	3AD	D22	7AE	D36	9AC	D49	3AK
Q73	4AH	D9	7AD	D23	3AC	D37	10AE	D50	9AD
Q74	7AH	D10	6AC	D24	8AE	D38	6AI	D51	8AI
Q75	10AG	D11	6AC	D26	5AF	D39	10AE	D52	9AF
Q76	4AK	D13	6AC	D27	4AC	D40	10AG		
Q77	3AK	D14	6AC	D28	4AC	D41	10AB		
Q78	5AK	D15	8AE	D29	9AF	D42	10AB		
Q81	11AF	D16	3AC	D30	4AD	D43	9AH		
Q91	5AJ	D17	8AE	D31	5AF	D44	4AB		

114EE
144EU
I362
I832
I619
I738

54   2SK1824

FMA5

SGM2014M

3SK241

2SC4093

2SB1132
2SC2954
2SC3357

Component side
Pattern 1
Pattern 2
Pattern 3
Pattern 4
Foil side

55

● Connect 1 and 4

Component side
Pattern 1
Pattern 2
Pattern 3
Pattern 4
Foil side

56

TM-V7A/E   TM-V7A/E

BLOCK LEVEL DIAGRAM

TM-V7A/E   TM-V7A/E

WIRING DIAGRAM
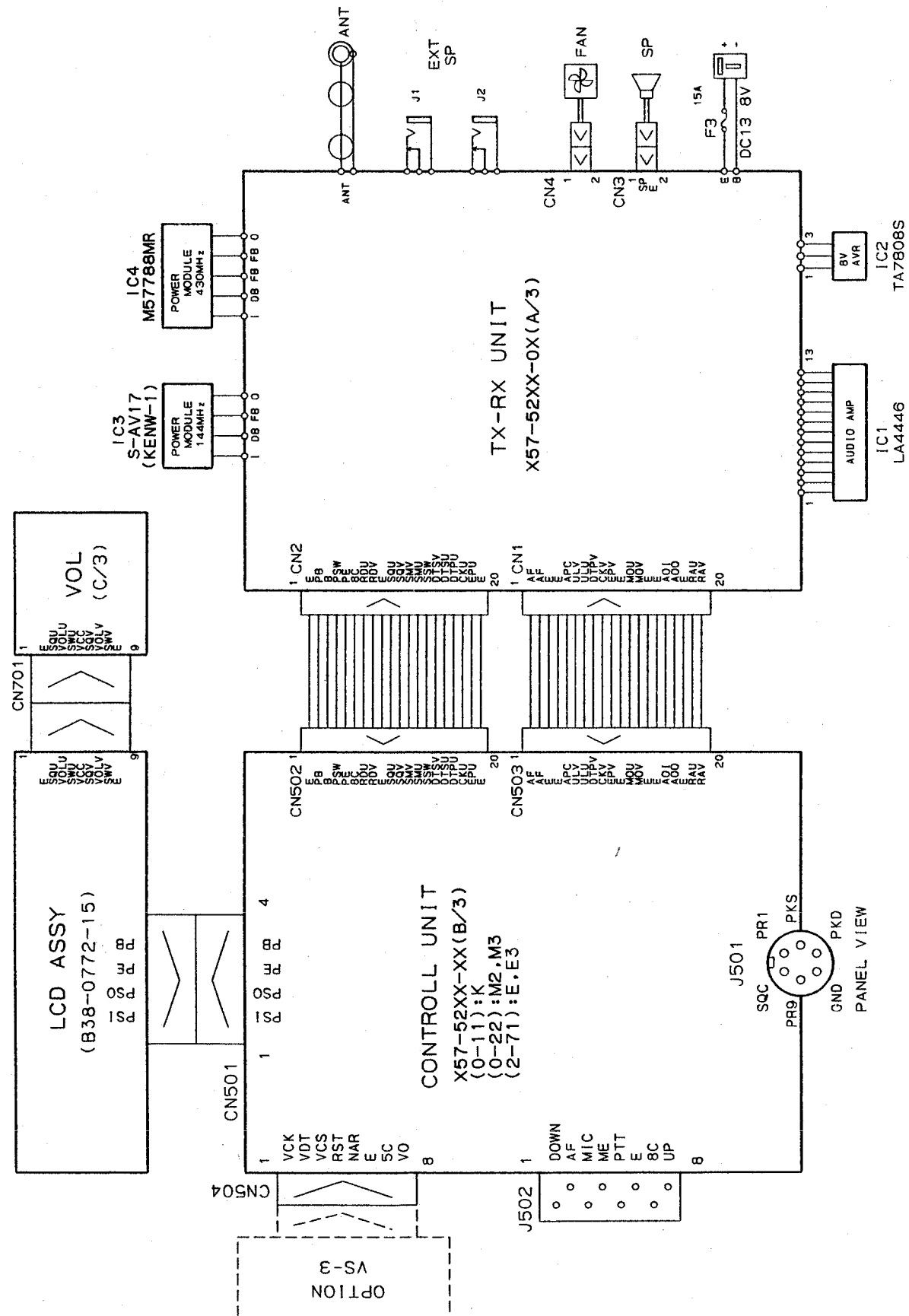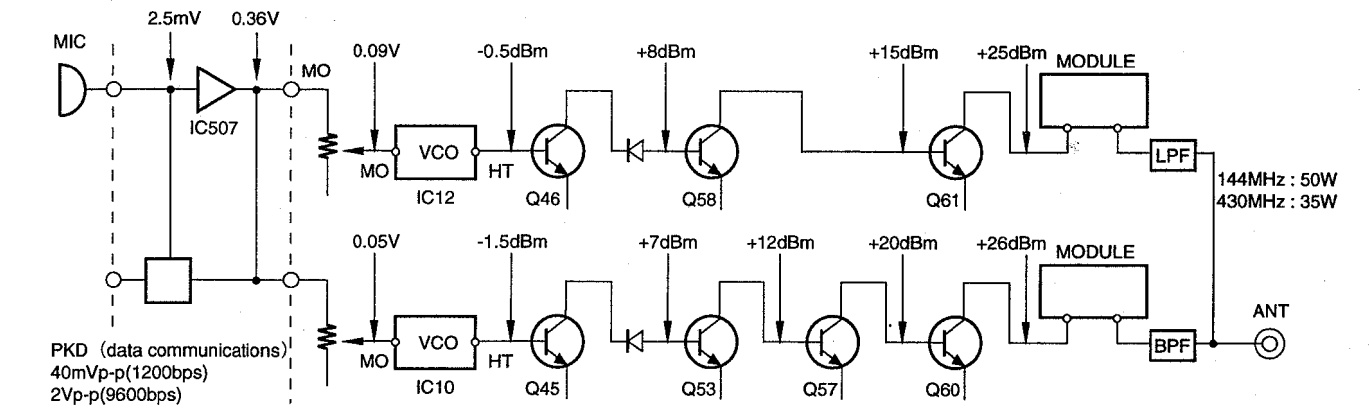
71

LEVEL DIAGRAM

Transmitter Section

144MHz : 50W
430MHz : 35W

PKD (data communications)
40mVp-p(1200bps)
2Vp-p(9600bps)

Note 1: Set the AG so that the microphone socket input is 3kHz deviation at 1kHz modulation.
The data communication connector input level is 3kHz deviation at 1kHz modulation for 1200bps and 2kHz deviation at 1kHz modulation for 9600bps.

Note 2: The transmit frequency is 145.0 or 435.0MHz.
Note 3: The HI/MID/LOW switch is set to HI.
Note 4: The measurements with the power meter, except for the ANT connector, are the values with the APC off.

Receiver Section

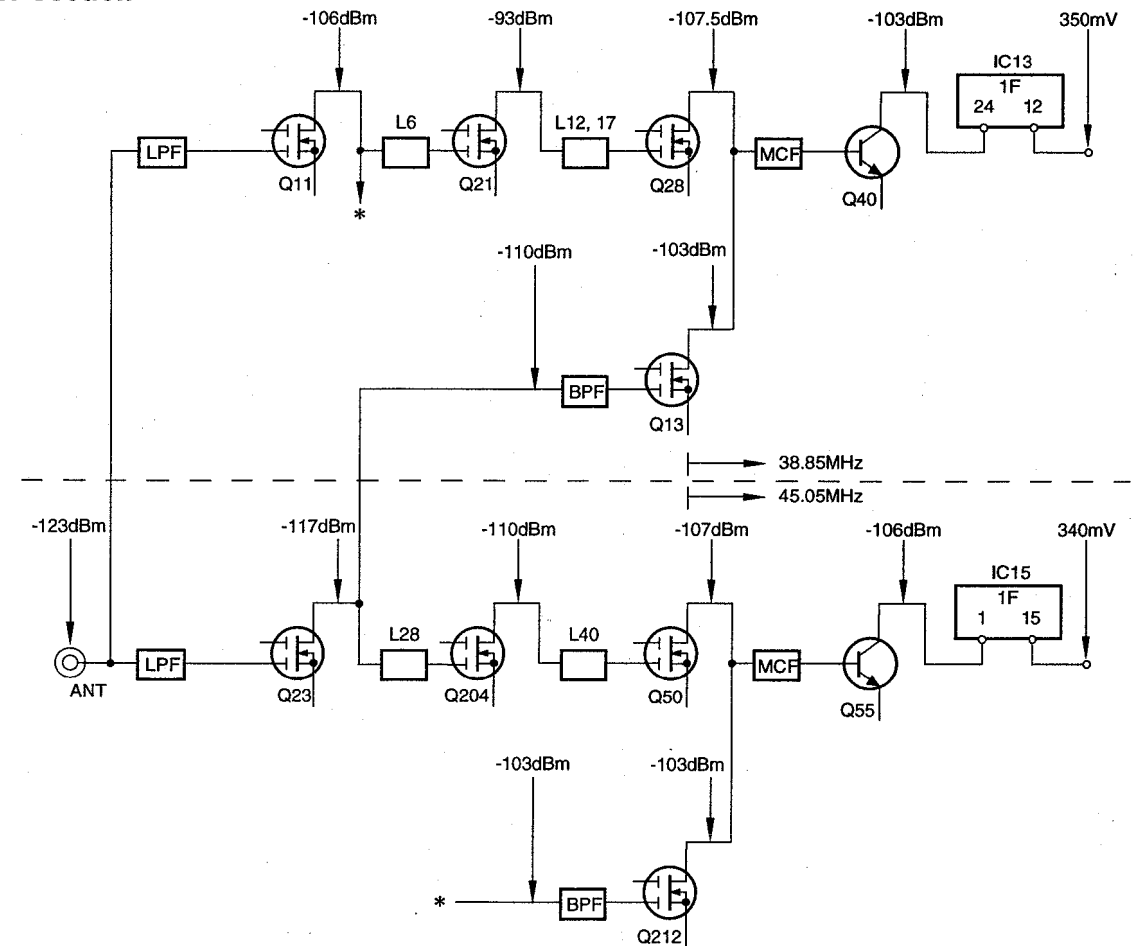Note 1: The 12dB SINAD levels were plotted using a standard signal generator through a 0.01µF ceramic capacitor at each point from the RF to the first IF.

Note 2: The AF levels were measured with an AF voltmeter when the -73dBm (50µV) standard signal generator signal modulated by a 1kHz modulation frequency and a 3kHz deviation was received and the AF output was adjusted to 0.63V/8Ω by the AF VR.

72

X57-523*-**(A/3) X57-527*-**(A/3) (SINGAPORE MADE) TX-RX UNIT

Note) ● Ref. No. : Parts of pattern 1.

TM-V7A/E SCHEMATIC DIAGRAM

X57-523*-**(B/3) X57-527*-**(B/3)(SINGAPORE MADE) TX-RX(CONTROL UNIT)

		R542	R543	R544	R546	R579	C584	C585	W501	W502	IC508
0-11	TM-V7A	K	-	-	0	0	8.2k	-	-	○	○	78P058GCJRHB
0-22	TM-V7A	M2.M3	-	-	0	0	8.2k	-	-	○		78P058GCJRJB
2-71	TM-V7E	E.E3	0	0		0	1.5k	1000p	1000p			78P058GCJRJB

IC501 : TA78L06F   IC505 : PST9130NR   IC508 : 78P058GCJRJB(0-22.2-71)   IC512 : AT25320N10SI27   Q501,505,506,508,509 : 2SC4738(
IC502 : TA78L05F   IC506 : LC73881M   IC509 : BU4066BCF   or X25320SI-2.7   Q504 : 2SA1519
IC503.510 : JLC1555F   IC507 : AK2343   IC511 : TA75S393F   or AT25640N10SI27   Q507 : 2SK1824
IC504 : MB87032APFGBND   IC508 : 78P058GCJRHB(0-11)   IC513 : TC74HC4050AF

TM-V7A/E   TM-V7A/E

BLOCK LEVEL DIAGRAM

WIRING DIAGRAM

LEVEL DIAGRAM

Transmitter Section

MIC

2.5mV 0.36V

IC507

MO

0.09V -0.5dBm +8dBm +15dBm +25dBm MODULE

MO

VCO HT

IC12

Q46 Q58 Q61

LPF

144MHz : 50W
430MHz : 35W

PKD (data communications)
40mVp-p(1200bps)
2Vp-p(9600bps)

MO

0.05V -1.5dBm +7dBm +12dBm +20dBm +26dBm MODULE

VCO HT

IC10

Q45 Q53 Q57 Q60

BPF

ANT

Note 1: Set the AG so that the microphone socket input is 3kHz deviation at 1kHz modulation.
The data communication connector input level is 3kHz deviation at 1kHz modulation for 1200bps and 2kHz deviation at 1kHz modulation for 9600bps.

Note 2: The transmit frequency is 145.0 or 435.0MHz.
Note 3: The HI/MID/LOW switch is set to HI.
Note 4: The measurements with the power meter, except for the ANT connector, are the values with the APC off.

Receiver Section

-106dBm -93dBm -107.5dBm -103dBm 350mV

LPF

Q11 L6 Q21 L12, 17 Q28 MCF Q40

IC13
1F
24 12

*

-110dBm -103dBm

BPF

Q13

38.85MHz
45.05MHz

-123dBm -117dBm -110dBm -107dBm -106dBm 340mV

ANT LPF

Q23 L28 Q204 L40 Q50 MCF Q55

IC15
1F
1 15

-103dBm -103dBm

* BPF

Q212

Note 1: The 12dB SINAD levels were plotted using a standard signal generator through a 0.01µF ceramic capacitor at each point from the RF to the first IF.

Note 2: The AF levels were measured with an AF voltmeter when the -73dBm (50µV) standard signal generator signal modulated by a 1kHz modulation frequency and a 3kHz deviation was received and the AF output was adjusted to 0.63V/8Ω by the AF VR.

ANT

EXT SP

FAN

SP

DC13 8V

F3 15A

J1

J2

CN4

CN3

IC4 M57788MR POWER MODULE 430MHz

IC3 S-AV17 (KENW-1) POWER MODULE 144MHz

TX-RX UNIT X57-52XX-0X(A/3)

8V AVR

IC2 TA7808S

IC1 LA4446 AUDIO AMP

VOL (C/3)

CN701

LCD ASSY (B38-0772-15)

CN501

CN504

CONTROLL UNIT X57-52XX-XX(B/3)
(0-11):K
(0-22):M2,M3
(2-71):E,E3

J502

J501

PANEL VIEW
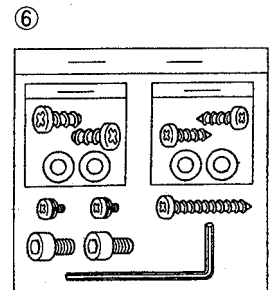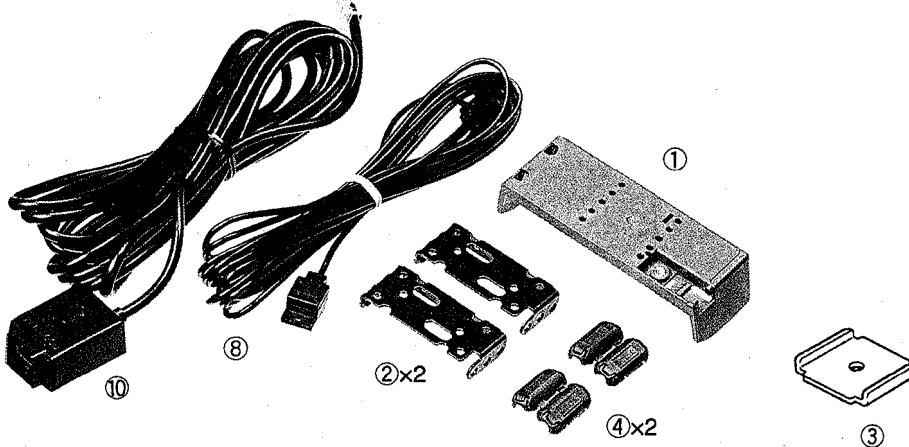
OPTION VS-3

CN2 CN1

CN502 CN503

DETACHABLE FRONT PANEL KIT
(DFK-3C/4C/7C)
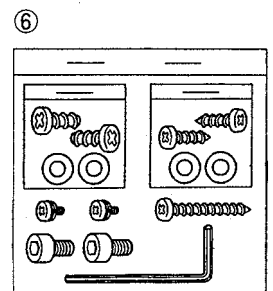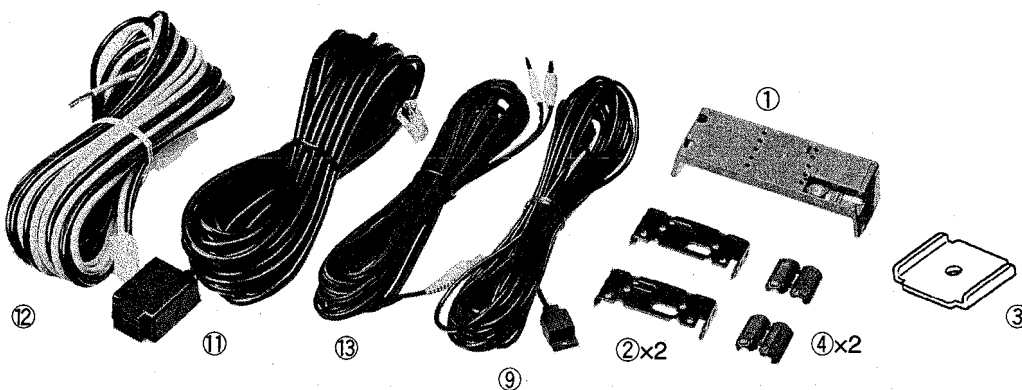
DFK-3C (3m)
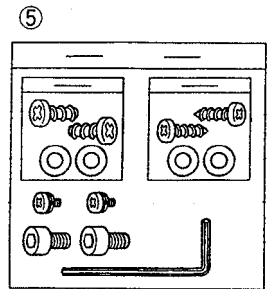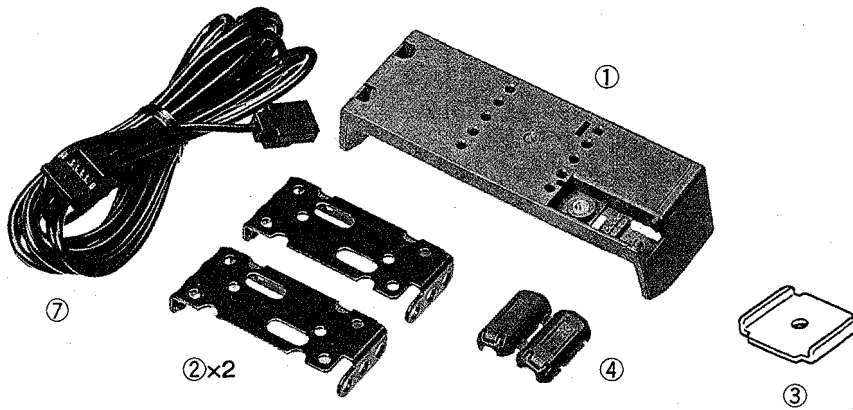
DFK-4C (4m)

DFK-7C (7m)

DFK-3C/4C/7C MAIN PARTS LIST

Ref. No.	New Parts	Parts No.	Q'ty	Parts Name	Model
1	*	A62-0495-03	1	One touch panel	
2		J29-0475-04	2	Bracket	
3		J21-4457-04	1	Cable connector bracket	
4		L79-1417-05	1	Line filter	3C
4		L79-1417-05	2	Line filter	4C / 7C
5		N99-0381-15	1	Screw set	3C
6		N99-0389-15	1	Screw set	4C / 7C
7		E30-3189-15	1	Panel cable (3m)	3C

Ref. No.	New Parts	Parts No.	Q'ty	Parts Name	Model
8		E30-3190-15	1	Panel cable(4m)	4C
9		E30-3192-15	1	Panel cable (7m)	7C
10		E30-3151-05	1	Microphone cable (4m)	4C
11		E30-3153-05	1	Microphone cable (7m)	7C
12		E30-3191-05	1	Speaker cable (5m)	7C
13		E30-3199-05	1	DC power cable (6m)	7C
–		F51-0018-05	2	Fuse (20A)	7C

TM-V7A/E

SPECIFICATIONS

Specifications are subject to change without notice due to advancements in technology.

General		VHF Band	UHF Band
Frequency range	U.S.A/Canada	144~148MHz	438~450MHz
	General	144~148MHz	430~440MHz
	Europe	144~146MHz	430~440MHz
Mode		F3E (FM)	
Antenna impedance		50Ω	
Usable temperature range		−20℃~+60℃ (−4°F~+140°F)	
Power supply		13.8V DC±15% (11.7~15.8V)	
Grounding method		Negative·ground	
Current	Transmit (max.)	11.0A or less	10.0A or less
	Receive (at 2W output)	1.0A or less	
Frequency stability (−10℃~+50℃)		Within ±3ppm	
Dimensions (W×H×D projections included)		140×54.5×205.5mm / 5.51"×2.15"×8.09"	
Weight		1.2kg / 2.6lb	

Transmitter			
Power output	High	50W	35W
	Mid	Approx. 10W	
	Low	Approx. 5W	
Modulation		Reactance	
Spurious emissions		−60dB or less	
Maximum frequency deviation		±5kHz	
Audio distortion (at 60% modulation)		3% or less	
Microphone impedance		600Ω	

Receiver			
Circuitry		Double conversion	
Intermediate frequency (1st / 2nd)		38.85MHz / 450kHz	45.05MHz / 455kHz
Sensitivity (12dB SINAD)	VHF or UHF band	0.16μV or less	
	Sub VHF or UHF band (in VHF/VHF or UHF/UHF mode)	0.25μV or less	
Selectivity (−6dB)		12kHz or more	
Selectivity (−60dB)		28kHz or less	
Squelch sensitivity		0.1μV or less	
Audio output (8 ohms, 5% distortion)		2W or higher	
Audio output impedance		8Ω	

Note: Receiver specifications apply only when using the main VHF or UHF band. They do not apply to the sub VHF or UHF band in VHF/VHF or UHF/UHF mode.